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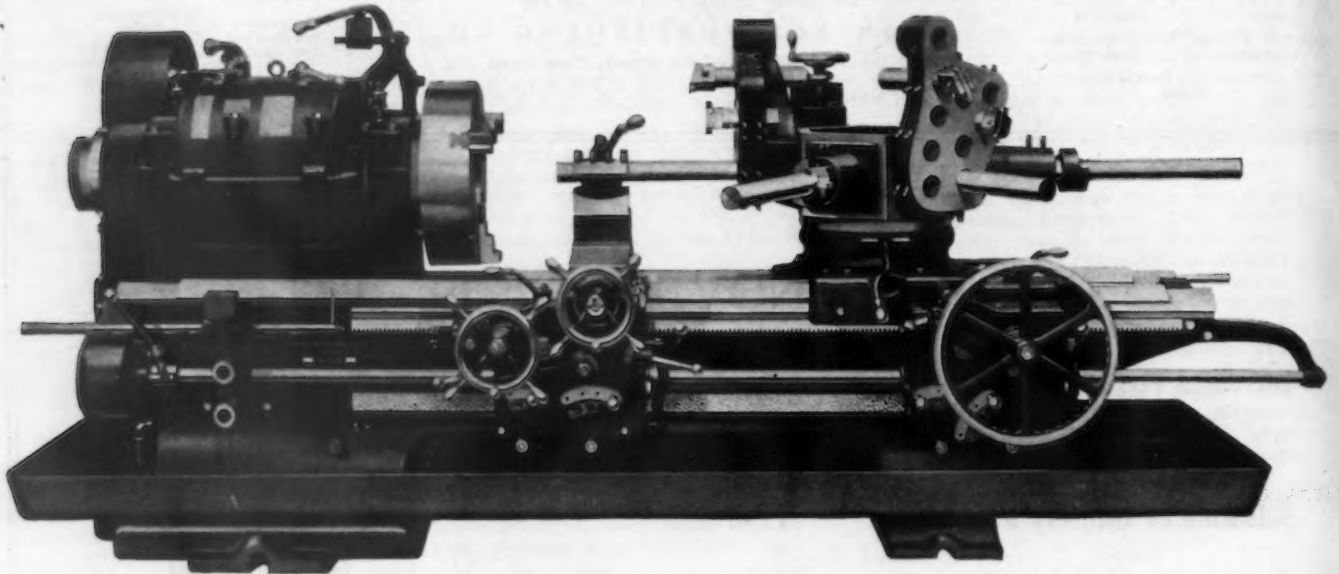
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The Warner & Swasey Company

Cleveland, Ohio, U. S. A.

THE IRON AGE

New York, November 29, 1928

ESTABLISHED 1855

VOL. 122, No. 22

Increased Flexibility in Steel House



Substitution of Steel for Wood Members Permits Architectural Freedom in Dwelling Construction

STANDARD methods of wood frame construction have been adapted to the building of steel frame dwellings by simply substituting steel members for corresponding wood units in a house now being completed at Mount Lebanon, Pa., a Pittsburgh suburb. The frame of the dwelling, which was fabricated and erected by the Steel Frame House Co., Pittsburgh, a subsidiary of the McClintic-Marshall Co., was planned to give architects full leeway in their design and to allow builders to construct the building in the manner to which they are accustomed with wood frames. At the same time the owner was allowed to choose the type of house he desired with practically any floor plan and architectural treatment and was given the advantages of fireproof, non-shrinkable and rigid construction.

The house was designed by Lyon & Taylor, New York architects, and is being built by the L. O. Maines Construction Co., Pittsburgh, under the general supervision of L. Brandt, Pittsburgh housing engineer.

Architectural Standardization Avoided

The steel frame in the Mount Lebanon house takes the place of ordinary wood framing in every detail from the sill to the rafters, including all interior partitions and the framing of all openings, dormers and windows. The foundation is identical with that used for a wood frame. The architects were able to carry out the owner's plan and space requirements and to design the architectural features with the same speed and facility to which they have been accustomed in designing masonry or wood frame houses. Heretofore attempts to adapt steel framing to domestic construction have been centered largely around the idea of standardized units and designs in order to achieve the necessary economy in fabrication. In this instance, dimensions which the architect required within a maximum difference of 2 in. were met by the Steel Frame House Co. system, and with

slight extra care exact dimensions can be satisfied to a fraction of an inch where special details make it necessary.

The complete frame for this house was fabricated at the mill and delivered at the job site ready to erect with the use of ordinary tools, a wrench taking the place of hammer and saw. No cutting and fitting, welding or riveting was required at the job and the frame was erected in a relatively short time, particularly in view of the fact that all partitions, doors, window frames and other structural members were completed at the same time. Other standard materials employed in fireproof construction were used in conjunction with the steel frame with no more difficulty and at no greater cost than when they are employed with solid masonry walls or a wood frame. Mechanics wholly unfamiliar with the new system of construction completed the house without preliminary training and with only the normal amount of supervision after the special methods which had been developed were once demonstrated by the supervising engineer.

Frame of Standard Steel Sections

The frame itself is built up of standard steel sections, employing light steel angles for studs, corner posts, lintels and around openings. The horizontal members, including sills, girts and plates, are built up of standard channels. The floor joists are light steel I-beams, Junior beams of the Jones & Laughlin Steel Corporation having been used in this instance, and the roof rafters are channels. With the exception of the floor joists, all of the members are perforated along the flanges with 7/16-in. holes on 2-in. centers. This perforation is the heart of the system, for it permits assembly within a maximum dimensional limitation of 2 in. in any direction.

In a house of this type, when the architect's plan is received at the mill, an engineer prepares a framing plan



(Above) The brick veneer is applied next to the steel reinforcing fabric over a heavy waterproof backing.

(Right) The completed steel frame ready for the exterior walls. (Below) The concrete floors are laid on heavy reinforcing steel fabric over a waterproof backing, without the use of forms



and bill of materials in the ordinary manner. All of the principal structural units are taken from stock and the few special units are quickly fabricated from elements in stock that simply require cutting to length and the attachment of end clips or connections.

The degree to which these units have been developed is responsible for the simplicity with which the framing can be fabricated rapidly while meeting the special requirements of each individual building. The assembled structural units are then properly marked and delivered to the job, where they are put together in the normal sequence of operations employed for wood framing, merely substituting bolts for nails. This system, it is emphasized, reduces the amount of labor required for fabrication by substituting machine methods, permits carrying standard structural units in stock, gives the architect full freedom in design and enables the builder to follow erection methods that have already become familiar to him through the use of wood framing.



As the frame of a dwelling represents only 10 to 20 per cent of the cost of the completed house, importance is attached to the methods of employing standard building materials in conjunction with the structural steel framework. In this house the exterior walls are of brick veneer, of a new type of reinforced veneer construction. Over the exterior surface of the framing members a welded mesh reinforcing fabric, made by the National Steel Fabric Co., a subsidiary of the Pittsburgh Steel Co., with a heavy waterproof backing, is applied by means of clips, which are in turn attached to the studs and corner posts through the perforations in these members. The galvanized steel fabric is of the type used for stucco construction. When the stucco is applied, the waterproof backing is pressed away from the reinforcing wires, which become embedded in the stucco and serve in the same way as steel in ordinary concrete structures.

Outside of this fabric a 4-in. brick veneer facing is

laid and the cement mortar is run down in back of the brick against the reinforcing fabric with which it forms a bond. The waterproof backing protects the interior of the structure from dampness and is counted on to add an insulating membrane. For additional security, wire wall ties are embedded in the horizontal joints of the brick work and clipped to the reinforcing wires of the fabric. The roof deck consists of wood purlins bolted to the rafters, which in turn carry a plank roof deck and a slate roof.

The floors in the house are of concrete, which is laid without the use of forms. For this purpose a wire fabric with waterproof backing similar to that used on the walls, but of heavier weight, is stretched across the steel floor joists and clipped thereto with special wire clips of simple design. A 2-in. concrete slab is poured directly on the fabric, the waterproof backing of which acts as a form. Here again the weight of the concrete presses the backing away from the reinforcing wires, which thus become enmeshed in the slab. Wood sleepers are embedded in the floor in the areas where wood top floor is used, while in some rooms the slab itself is finished to a level surface to receive tile or a resilient flooring material.

The interior walls and ceilings are plastered on a third type of reinforcing fabric with waterproof backing which is slightly lighter in weight than that on the exterior walls. In this case the reinforcing wires are embedded in the plaster, forming a mechanical reinforcement for the plaster and serving to assure a sturdy type of wall.

Special provision is made in the steel frame for pipe chases, the smaller pipes being carried within the stud space and the larger ones, such as soil pipes, which cannot go in normal 4-in. partitions, being carried in special enclosures in the manner ordinarily employed in wood frame construction. Electric conduits, either of the pipe or flexible armor type, are carried through the walls in the usual manner and may run between the floor slab and the ceiling beneath as required. Before plastering is started ordinary wood grounds are attached to the steel frame to receive picture moldings, baseboards, door and window trim and other finishing details.

Fireproof Features Emphasized

The resulting house may be rightfully called a fireproof home, for its floors, walls and roof are of incombustible materials and, with the exception of decorative trim and occasional wood floor surfaces, no wood is employed at

any point in the construction. Even this use of wood can be eliminated by employing hollow metal or Kalamein doors and trim, a concrete or other fireproof roof deck and various types of incombustible finished flooring materials. While the "exposed" steel and specially light steel members in the frame would lose their strength under high temperatures, all of the members in this construction are inclosed behind surfaces of reinforced plaster or masonry. A plaster wall on metal lath or this new type of reinforcing fabric is considered an effective fire retardant.

Plaster Cracks Will Be Avoided

This type of rigid steel construction, it is held, will help to eliminate the cracking of plaster due to vibration, wind stresses and other strains. As steel expands and contracts so little under temperature changes, plaster cracks or other defects developing within the structure seem unlikely on this account. All of the steel received a heavy coating of non-corrosive paint besides being protected on both sides by a waterproof membrane and by masonry surfaces calculated to prevent moisture from having access to the framing members and shortening the life of the steel. The steel frame is advanced as vermin and lightning proof.

The builders of the Mount Lebanon house present an interesting argument in favor of steel frame house construction by stating that the fireproof, rigid and permanent character suggest the use of quality materials wherever practicable. When a steel frame house of this type is constructed the building material merchant sells the same products that he has been selling heretofore with the exception of rough lumber and wood lath and he also is likely to sell higher quality materials with a consequent larger volume of business and margin of profit.

Local Stocks of Steel Members

It is suggested that, while practical considerations at present will probably make it necessary for the manufacturers of the steel frame to handle their business direct or through agencies, the situation may ultimately change and the stock of steel frame units may be carried in local warehouses and by dealers. Thus there is nothing to disturb the materials dealer in the development of the steel frame house, and his cooperation is urgently needed if the wide market opened to steel in this type of construction is to be fully developed.

Alloyed Cast Iron Rolls

IN an article on rolls for rolling mills, F. C. Biggert, Jr., of the United Engineering & Foundry Co., Pittsburgh, in a periodical published for its employees, has the following to say:

Alloyed cast iron rolls are made both in chilled and grain qualities. The grain roll, so called because of its somewhat mottled or grained structure, corresponds to the ordinary sand roll.

In the chilled quality they may be made much harder than ordinary chilled rolls; they have a very high wear resistance and are considerably stronger. Particularly they are valuable on account of their resistance to spalling.

Spalling is the technical term for surface flaking, and is the cause of much trouble to the user of chilled rolls. An ordinary chilled roll is easily bruised. For instance, a sharp blow on the chilled surface with a hand hammer, while it may not cause a visible mark, will have bruised the metal so that a short period of rolling will cause a piece to drop out.

The new alloyed chilled rolls, for which, by the way, our company holds patents, will stand very severe usage without spalling, and in rolling some products, this quality has

practically meant the difference between failure and success.

The new alloyed grain rolls correspond, in a sense, to sand rolls, but are so hard and close grained that in many places they have been substituted for ordinary chilled rolls. Their wearing qualities are almost phenomenal, and combined with very good strength, give them a wide field of usefulness.

Still another type of roll recently developed is so hard that no tool has been able to turn it, and all shaping must be done by grinding. This type is now being used for cold rolling, where it has replaced hardened steel rolls, and to some extent, in hot rolling of flat material.

Chemical Solvent for Metal Cleaning

The chemical solvent trichlorethylene is being used for degreasing metal parts in some European shops. This substance has the chemical formula C_2HCl_3 , boils at 190 deg. Fahr., smells like chloroform, and will not burn or explode. Cleaning is done in three trays, one heated, the intermediate and final for rinsing. The heated tray has a water cooled cover, for condensing the rising vapors. Dirty liquid is regenerated in a simple distillation apparatus.

Self-Rule of Industry a Delusion

Sanction of Regulated Competition Leads to Extremes in Governmental Control—Better Banking Policy Offers Chief Hope of Balancing Consumption with Production

BY VIRGIL JORDAN*

WHEN the records are all in at the end of this year, I think it will be clear that 1928 will go down as the biggest year in our history from the point of view of industrial and trade activity.

Yet I do not believe there has been any year since the war, or even in our pre-war history, in which that over-worked word "prosperity" has had less real and definite meaning or has been more uncertain and questionable than it is today. I do not believe that there has been any time in our experience, outside extraordinary periods of war, of which it could be said that our situation has been marked by greater danger or about which more serious questions could be raised than that which we face now. When we have passed through it, successfully or unsuccessfully, I feel that 1928 will go down as a crucial year in our economic life, for in it we have come face to face with certain new, fundamental and unsolved problems of economic control and adjustment, and the future depends upon how clearly and generally we recognize these problems and how earnestly we attempt to deal with them in the next few years.

Economic Situation Out of Balance

The changes in production, distribution, consumption and finance that have created our "prosperity complex" have resulted in an extraordinarily unbalanced situation, marked by contradictory and inconsistent indications in respect to the trend of wages, prices, employment and profits. High wages in protected trades and occupations have not percolated down to the rank and file, or benefited workers in industries that have been left high and dry by the shifting tide of consumer wants. The high wage levels in some fields have availed the workers little in face of the declining opportunities for employment in these industries and have entailed wide shifts of the working population into new fields, the permanence of which is in turn uncertain.

Falling prices of raw commodities and basic materials in the face of continued high wages have perhaps benefited the lines in which these materials have been elaborated for the consumer's use, but the producer of these goods has had to face increasing pressure upon his profit margins, and there is little evidence that in most lines the consumer has had the benefit of lower prices. In fact, there is clear evidence that, while the prices of basic commodities have not shown signs of inflation, the general level of prices of the goods and services which constitute the general high standard of living in this country have steadily risen since the war and are nearly as high as during the period of war inflation. This in spite of intense competition and increased productive efficiency which have held prices in the basic industries at levels in some cases near the pre-war.

I need not repeat here the now familiar fact that in the last three years of prosperity the proportion of corpora-

tions reporting deficits in all lines of trade together was 41 per cent in 1925, 43 per cent in 1926 and, according to the statistics of income just released, rose to 45 per cent in 1927. The fact that among this continuing group of business concerns operating without profit or at a loss there are found the smaller concerns in industry and trade is admitted as a fact and is used to account for the large proportion of corporate business that is not conducted on a profitable basis.

Not only do these contrasts show themselves so strongly within each field of business enterprise, but more fundamental and serious still is the contrast which has been emphasized in recent years among the various major branches of our industrial structure. Everywhere it is the industries catering directly to the new wants and consumption habits of the population, providing the luxury goods and services that make for the high standard of living about which we talk, that have been most strongly stimulated and have enjoyed the greatest prosperity. This prosperity has been achieved in part at the expense of the older industries furnishing the basic materials and the fundamental services. The prices of these goods and services have tended to remain low or to fall throughout the world, while the goods and services that have been elaborated out of them and into which direct labor and distribution costs have been pyramided have tended to remain high or rise.

And among the nations as among the various industries the same contrasts have been emphasized in the years since the war.

We ought, I feel, to take stock earnestly of the situation and bring what knowledge we have to bear upon these questions. They all, in my opinion, resolve themselves into the question whether the relations that have heretofore existed between wages, prices and capital returns have or have not been permanently altered and whether or not we have entered into a period in which business is to be governed by a wholly new set of economic laws that will involve a fundamental reorganization of business in respect of competition and Government control and a fundamental change in financial structure and policies in respect of the control and distribution of credit.

Why Control of Production and Prices Is Urged

Of this central question there are two fundamentally opposing points of view which go to the root of economic thought about the present situation. One is that the maladjustment between wages, prices and capital returns, which has grown out of apparent overproduction and is the apparent cause of the difficulties and contrasts in many lines of industry and trade, must be met by a fundamental reorganization of the business structure. The anti-trust laws and Government policy toward business in general, it is declared, must be modified so as to permit a greater freedom of action in trade associations and combinations to control production, restrict competition and regulate prices.

*Chief economist National Industrial Conference Board, New York. From an address before the National Founders Association at New York, Nov. 21.

In this way it is anticipated that a sounder relationship can be established between wages and prices, from the point of view of capital returns, as a result of the increasing pressure upon employment that would flow from the closer integration and improved efficiency of industrial processes. Capital charges or normal profits would be made a fixed charge upon industry, through control of production and prices, instead of wages being a fixed charge and capital return a contingent charge, as is now the case. On this principle an effort would be made and the possibility created to make production follow demand instead of, as now, trying to raise demand to meet production. On this plan the equities of the small independent business enterprises would be in large part preserved, whereas now they are being steadily and rapidly wiped out through the relentless process of competition and overproduction.

With this line of thought I fundamentally disagree. I recognize that this process has taken and is taking place, rapidly here and abroad under the pressure of conditions that I have described, and I would admit there is a large and proper field for such reorganization of the business structure for improvement in conditions even without any revision of Governmental policy toward business. But I am convinced that in the long run it is fundamentally fallacious and dangerous to believe that the essential economic problem which we face is going to be solved in this way. That fundamental problem is the expansion and diffusion of consumer purchasing power at home and abroad in proportion to the expansion of our production and productive capacity. We cannot meet this problem in a sound economic way by restricting production or controlling prices in order to meet any fixed overhead charges necessary to preserve the existing capital equities in business enterprise, for this results inevitably in a more than proportionate restriction of consumer purchasing power.

The difficulty today is that production is more rapidly and fully financed than consumption, and you cannot meet this difficulty by any further financing or reorganization of production which increases the purchasing power of the investor's dollar and decreases that of the consumer. In the long run such an effort must defeat itself not only because a restriction of production involves a restriction of consumer purchasing power, but because the relatively high and protected returns to capital under such a system are bound to invite over-investment and increased competition, leading in turn to excessive production and falling prices under which the whole system will break down unless the Government or some outside authority steps in to control.

Regulation of Competition Leads to State Socialism

Such a principle is not only fallacious but dangerous, first because it is bound to stimulate increasing class conflict as between wage earners and investors, which we cannot assume will be materially mitigated by the kind of popular investment in corporate securities that has developed in recent years; and what is far more important it must lead inevitably to Government intervention much more far-reaching than that with which business has now to contend under the existing anti-trust laws. It seems to me obvious that business cannot ask of Government a free hand in the control of production and competition and the regulation of prices without finding itself forced to lean upon Govern-

mental authority to support and sanction the arrangements made and without thereby inviting Government to take an active part in the control of production and prices.

It is of ominous significance to me that in every instance in which, for special considerations, the Government in this or any other country has granted special privileges and exemptions under the anti-trust laws to particular fields of business activity, such as railroad, transportation, shipping, banking, agriculture and labor, it has found itself naturally compelled to set up special bureaucratic agencies of supervision and control in the form of Interstate Commerce Commission, Shipping Board, Federal Trade Commission and the Federal Reserve Board, part of whose functions it is

to supervise and control the exercise of these privileges in the public interest. Nowhere can we hope to escape this quid pro quo if we enter into a bargain with Government in this matter. You perhaps do not realize that, in the McNary-Haugen and similar legislation that has been pressed almost to the point of success for the relief of the millions of farmers who find themselves in the same position as that of the small independent business enterprises everywhere, we have presented to us the logical extreme to which this line of policy leads. The fundamental danger that lies in this type of legislation is that, in order to preserve the equities of the six and one-half million individual farm enterprises by raising and controlling the prices of farm products to the domestic consumer, the Government is forced to set up an agency with vast machinery not only to care for the surplus but ultimately itself to control production by regulating the number of farm enterprises, the acreage planted and the output of individual farms—a task that is not only of inconceivable difficulty but means

essentially that the Government, to all intents and purposes, will have taken over the operation of a gigantic industry, and embarked upon a policy of state socialism on the largest scale.

Solution Lies in Financial Policy

In recognition of the dangers that lie in this direction there is a slowly growing realization that the solution of the problem balancing production and consumption can be most hopefully sought, not in any general reorganization and limitation of production, but in the field of financial and banking policy, which is the fundamental and universal factor underlying the whole economic situation because of its profound influence on the expansion, contraction and distribution of consumer purchasing power. In other words, from this point of view the evils of overproduction are essentially evils of under-consumption and they must be attacked not on the side of production so much as on the side of consumption. We are coming more clearly to realize that, contrary to the views of traditional economic theory, general over-production as well as over-production in special fields is not only possible but is inevitable so long as our banking credit and monetary policies do not permit us to utilize our credit resources to finance consumer purchasing power as rapidly as we finance our productive power.

We used to believe that production automatically finances consumption. The fact that consumption does not grow with production has been forced upon us in the last ten years of enormous increase in productive equipment



VIRGIL JORDAN

and efficiency, which have left almost every industry with a tremendous excess of capacity, and we now know that in the financing of production and distribution enormous reserves of credit purchasing power are tied up and utilized several times over to increase the output of goods and services before they flow back into the hands of consumers to enable them to purchase these goods and services. Our traditional banking theory has been that the only legitimate uses of credit are to draw out production which will automatically provide its own purchasing power, and we have failed to realize that the function of credit is not fully performed, and that any advances against future production cannot be extinguished or liquidated, until the entire process is completed in the ultimate consumer's use of the product or service.

Consumption Must Be Dovetailed with Production

It is clear that the entire circle of production and consumption upon which economic progress must proceed cannot be made complete and cannot revolve smoothly until we find some way of controlling and distributing consumer purchasing power domestically and internationally in relation to productive power, and this can be done only through our national and international banking systems, whose fundamental function is the accumulation and distribution of credit resources.

The difficulty is that the realization of these things is so recent and new and involves such a fundamental revision in our banking theory and practice that we are not as yet prepared for the changes in policy which are involved. What is more serious is the fact that our financial system in its present form has developed so rapidly and so recently that we do not know how to proceed, even if we were ready to do so, to control the power which resides in it for the purpose we have in view. We recognize the tremendous power which lies in the hands of our central banking systems in this and other countries; but the principles and technique of central bank operation have had too short a time to be far developed, and there is as yet no fundamental agreement concerning them.

Even though we were to make the stabilization of prices a definite policy at home and abroad we cannot be sure that we are able to or know how to make it effective. We feel that we can exercise more control over credit expansion when the initiative to such expansion comes from industry and trade, but except for the crude and uncertain device of instalment buying, we have found no way effectually to initiate wider use of credit, especially in the direction of increasing consumer purchasing power, when the rate of production is exceeding that of consumption.

Federal Reserve System Facing Crucial Test

In this country at the present time we are in the midst of a profound evolution in financial methods and policies the outcome of which is impossible to foresee. The striking contrast between financial activity reflected in the course of security prices and business activity reflected in commodity prices, volume of production and trade is but an extreme expression of the problem of credit control and distribution with which our banking system is faced. Though it is officially minimized and disclaimed, the so-called struggle between the Federal Reserve System and the stock market is a real and significant aspect of this problem of credit control.

The powers and policies of the Federal Reserve System to exercise a critical control over the distribution of credit power and consumer purchasing power are entering a crucial period of trial the full meaning of which is little realized. Though still limited in its scope and functions by traditional theories of banking policy which were embodied in its legal basis, the Reserve System has made enormous progress in its short history toward a realization of its constructive possibilities in the administration and control

of credit resources. It has developed probably the best measures of production, trade and consumption that have been devised; it has found means of keeping the closest watch upon the expansion of credit and the pulse of business opinion. More significant still is the fact that under the leadership of the late Benjamin Strong it has been able to function perhaps more effectively and creatively in the international distribution of credit than in its domestic control, and laid the foundations for international cooperation among the central banks of the world, which is an indispensable factor in preserving economic stability and promoting economic development at home and abroad.

But because of the limitations and deficiencies in its structure and authority it has so far been unable to exercise that control over the distribution of purchasing power internally which is fundamentally necessary for balanced economic development in this country. The initiative in the expansion of credit and in the utilization of individual and corporate savings has been taken out of its hands, and an enormous expansion of productive capacity has been financed out of bank credit far in excess of savings, without regard to the proportionate expansion of consumer purchasing power that is necessary to sustain this enormous superstructure of productive investment of bank credit. The consequence is that commodity prices have remained relatively low while the prices or values of capital equities have been inflated far beyond the limit of possible earnings on the basis of existing consumer purchasing power.

What is more striking is that an enormous volume of direct consumer purchasing power in the hands of persons of small income is tied up in commitments for the speculative purchase of these capital equities, and thus is actually withdrawn from the market for consumers' goods. How the equilibrium between productive capacity and consumer purchasing power will be restored no one can say positively at this moment. The enormous investment of bank credit in capital expansion may have to be spent and written off without return or with much lower returns than the investors anticipated. Wages may have to undergo a further inflation without a corresponding inflation in commodity prices in order to bring the level of consumer purchasing power higher. The readjustment may have to come through a collapse in commodity prices far below their present levels, to stimulate consumption proportionate to the increased productive capacity.

Must Prevent Unwise Distribution of Credit

Under our present financial organization there is only one way by which additional consumer purchasing power can be called into existence by the use of credit in sufficient volume to help sustain our enormously increased productive investment. The Federal, State and local governments, through their expenditures for public improvements and public services, together constitute the largest factor in the control of consumer purchasing power. They are the only agencies that are able to draw upon credit resources in any considerable amount for purposes of direct consumption. It may therefore be necessary in the event of a general depression for the Governmental agencies in this country to embark upon tremendous projects of public improvement and construction in order to sustain the general consumer purchasing power sufficiently to utilize our industrial capacity. The dangers that lie in this direction I need not enlarge upon but it is a grave question whether even such an influence would be adequate and permanent enough to meet the requirements.

Our main problem for the future is to develop such banking policies and methods as may prevent undue utilization of our credit resources through speculation, for the expansion of our productive capacity and increase of our overhead capital charges to stabilize the general level of prices, and to keep consumer purchasing power in step with production.

Automatic Seamless Pipe Mill

Avoidance of Straight-Line Flow to Achieve
Flexibility—Two Piercers Used to
Avoid Punishing Steel

BY SIDNEY G. KOON*

TWO independent automatic seamless pipe mills have been placed in the Aliquippa plant of the Jones & Laughlin Steel Corporation, Pittsburgh. The first of these, which is capable of making pipe from 6% to 14% in. outside diameter, has been in operation for some time. The second mill was more recently completed, and is now in operation. This mill makes pipe from 2% to 6% in. outside diameter.

There are six hot working machines in the larger mill and there are five in the smaller, besides two reducing mills. The six include a piercer, an expander, a plug mill, two reelers and a sizing machine. These are not set in a straight or continuous line, but are staggered, with short transfer tables between them, which gives a certain flexibility not possessed by a straight-line flow.

After leaving the sizing machine the pipe traverses a set of cooling-racks, which again, for purposes of convenience, do not form a straight line, but are in two sections with transfer between them. When sufficiently cooled the pipe goes through a straightening machine, and then is delivered to the finishing department, where it is cut off to length, has the ends chamfered and threaded, receives a hydrostatic test and is passed into the shipping sheds.

Inspection is exceedingly rigid, beginning with the blooms in the bloom yard. These are heavy, ranging from 8 x 8 to 14 x 14 in. in section and about 10 ft. long. All blooms are pickled in open-air pickling tanks, then chipped

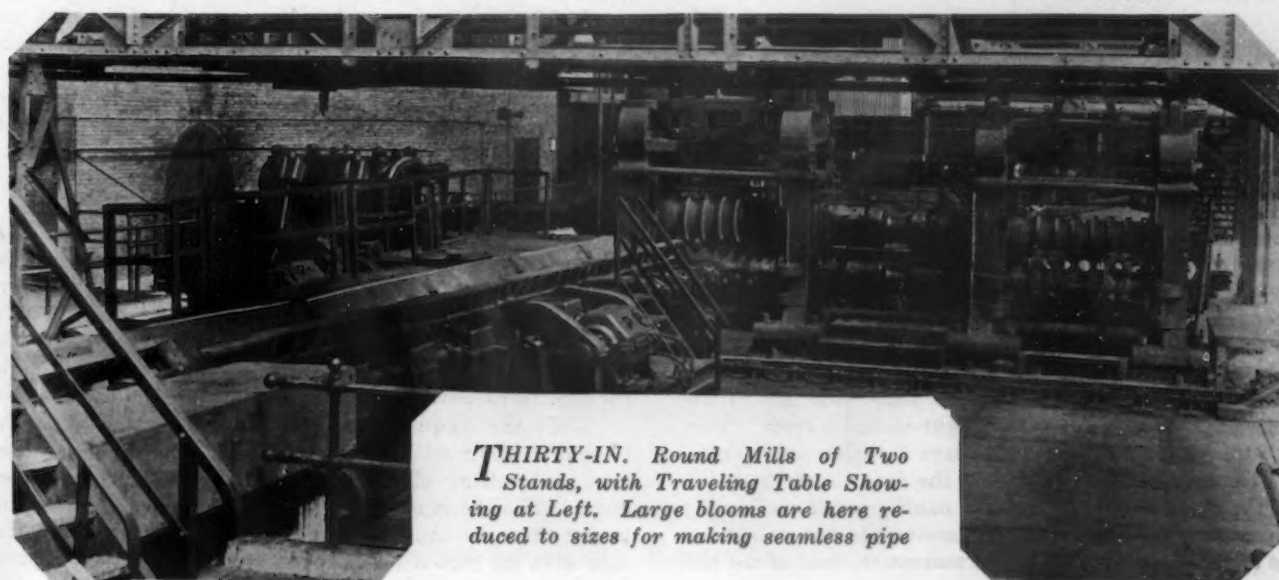
and carefully inspected after the chipping is done, before going to the heating furnaces serving the round mill.

Passing through either of two continuous furnaces, which they enter endwise at one end and leave endwise at the other end, the blooms are rolled on two-high sets of rolls in two stands, served on both sides by traveling tables. The rounds thus produced form the raw material for the tube mill. Before shipment to that mill, however, they are cut to length by hot-saws and one end of each piece is given a deep center-punch mark in a machine which utilizes both pneumatic and hydraulic pressure, the one for striking the blow, while the other holds the piece in position.

Rounds Are Charged Hot

While still at a bright red heat—a temperature of about 1700 deg. Fahr.—these rounds are transported by standard-gage special railroad car and locomotive to the charging side of the tube mill furnaces. Here they are picked from the car, eight or ten at a lift, by a fork suspended from an overhead traveling crane and are deposited upon the charging skids of one or the other of the two furnaces. As so placed, each blank has its punched end in position (at left in plan of mill) for meeting the centering point on the piercing mill.

It is said that the two furnaces serving the tube mill are the longest continuous furnaces of that type in any plant. They use producer gas for fuel, with occasional by-product gas when it happens to be available. The rounds roll by gravity on the furnace bottom until, on reaching the

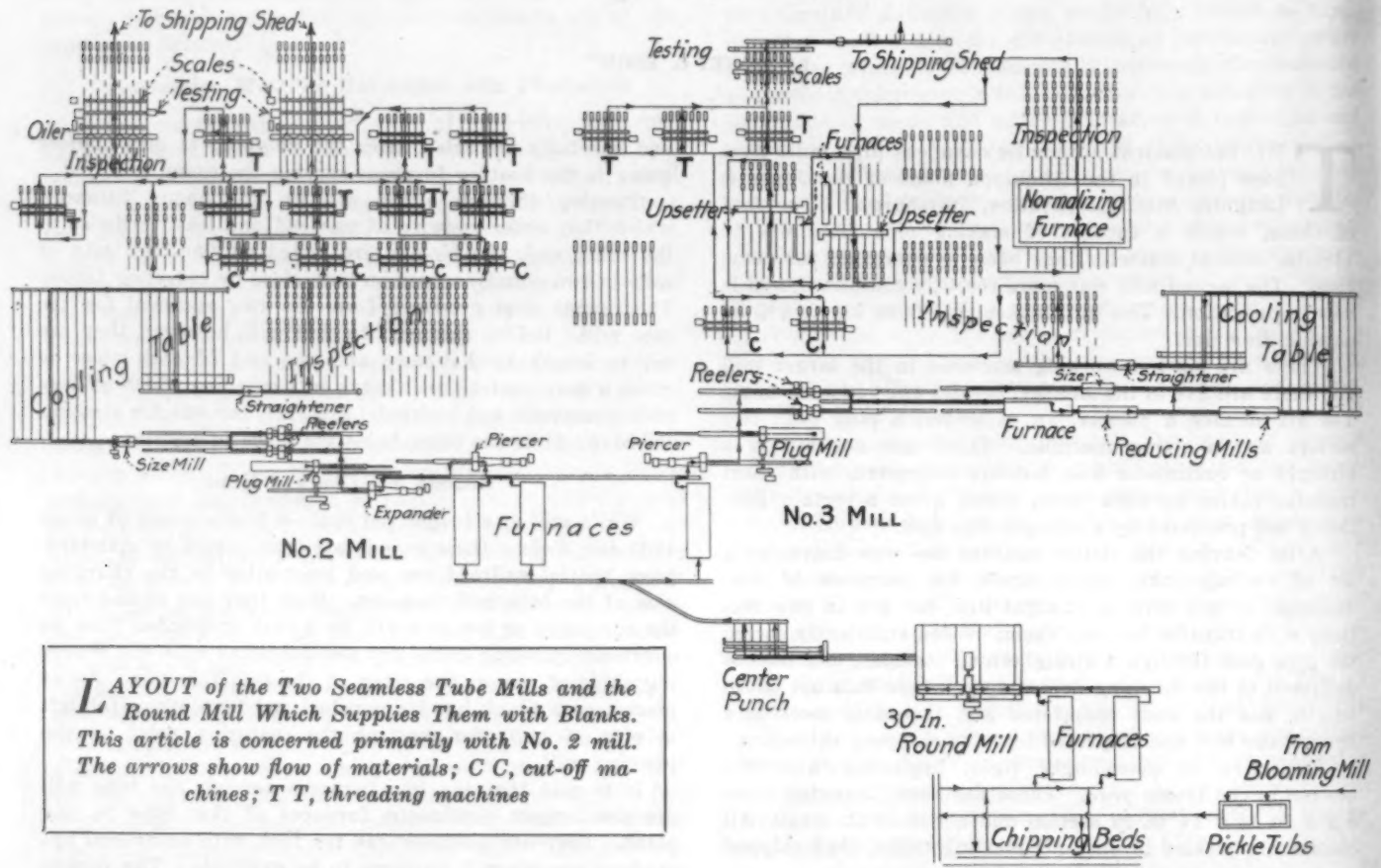


THIRTY-IN. Round Mills of Two
Stands, with Traveling Table Show-
ing at Left. Large blooms are here re-
duced to sizes for making seamless pipe

exit, they are thoroughly soaked with heat and are at the proper rolling temperature. The fact that they roll on the furnace bottom and do not slide is an advantage in uniformity of heating.

Each blank is pushed from its furnace lengthwise and then rolls sideways over a short section of transfer to enter the piercing machine. This consists of the Mannesmann type of crossed rolls with mandrel, the general operation of which has been described in *THE IRON AGE* at various times; in particular, see page 473 of Feb. 18, 1926, and page 681 of March 11, 1926. To take the thrust imposed upon the mandrel, there is a thrust bearing with 17 collars

From the expander another sideways movement places the blank in line for the plug mill, through which it passes in a manner similar to the foregoing, but under the action of a totally different type of roll. The relatively thin wall left by the expander is made still thinner in the plug mill, the operation of which is shown in another diagram. The rolls here have parallel axes and operate in the same manner as rolls in most forms of rolling. They leave the piece with a wall thickness approximately the same as that for the finished job. It differs from the finished pipe in several particulars, however. The interior and exterior are still somewhat rough, the pipe is a little under the finished size



arranged similarly to the propeller thrust bearing on a steamship. With adequate lubrication, this device performs its function without distress.

Operation of Piercing Machine

As the blank enters the piercing machine, the piercing point at the end of the mandrel bar is applied to the centered end of the round blank. As the outside surface of the round is gripped by the angular rolls, they start it rotating and at the same time advancing against the point on the mandrel. The action of the crossed rolls would open a hole through the center of the bar even were no mandrel present. The particular advantage of the mandrel with its point is that it guides the bar and thus makes the hole concentric as well as uniform in section. At the same time, of course, the displacement of metal results in elongating the bar.

Leaving the piercing machine, practically all of the blanks pass through the expander or second piercer. They reach this unit by a second sideways transfer and here receive treatment similar to that in the first piercer, but such that the piece comes out with a much thinner wall and a larger diameter. The diagram showing the successive sections of the pipe produced by the successive units of the mill illustrates this point clearly.

and it is not quite round. It receives two passes through the plug mill, being turned by hand 90 deg. after the first pass.

Stripping rolls are arranged at one side of the plug mill for running the pipe back after the pass has been made. The working rolls are moved away from each other through control of the operator and the stripping rolls then grip the piece and send it back. By this arrangement both sets of rolls are kept continually running without reversing direction, but they rotate in directions opposite to each other.

As the passage through the reelers is slower than that in the three mills already described, two units of this type are provided, to follow the succession of single units. Here again the oblique roll arrangement is used, but with rolls different in shape from the Mannesmann type. The mild expanding action here is of the planishing type, resulting in giving smooth surfaces to both the interior and the exterior.

While the operation in the reeling machines is similar to that of the piercing mills, it is much more gentle. The type and setting of the rolls are similar, but of smaller angle, while the plug over which the pipe passes is slightly larger than the inside diameter of the finished pipe. The rolls give the pipe a forward rotary motion and exert pressure, causing its walls to assume the exact final thickness.

PLUG Mill, for Further Opening Up of the Pierced Blank, and Thinning Its Walls, After It Leaves the Expander or Second Piercer. Two passes are required here, the piece being turned 90 deg. by hand after the first pass



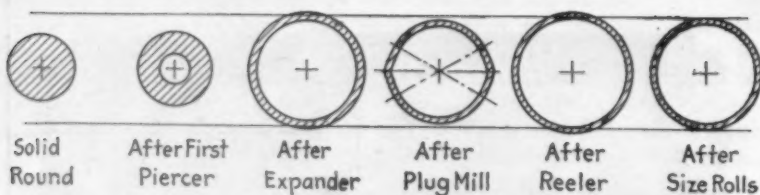
Only one other operation is performed on the pipe while hot. This is to pass it through the sizing rolls, which reduce it from the slightly over-size at which it left the reelers to the exact diameter required for the finished pipe. There is no change in the wall thickness in this operation, while the smooth surfaces inside and outside are maintained. The sizing machine has five pairs of two-high rolls, the axes of each pair at 90 deg. from its predecessor and all at 45

deg. from the floor. Proper regulation of the speed ratios of the rolls in this unit makes the elongation of the pipe compensate exactly for the slight decrease in diameter which it undergoes in passing through.

In addition to making the various mill parts unusually sturdy, measures were taken in the design to guide the round, and later the pipe, closely in obtaining accurate results. The whipping of mandrel bars was thus practically



GENERAL View of Entire Mill, from Sizer in Left Foreground to Furnaces in Right Background. The unusual lighting conditions are shown here, in the large glass area



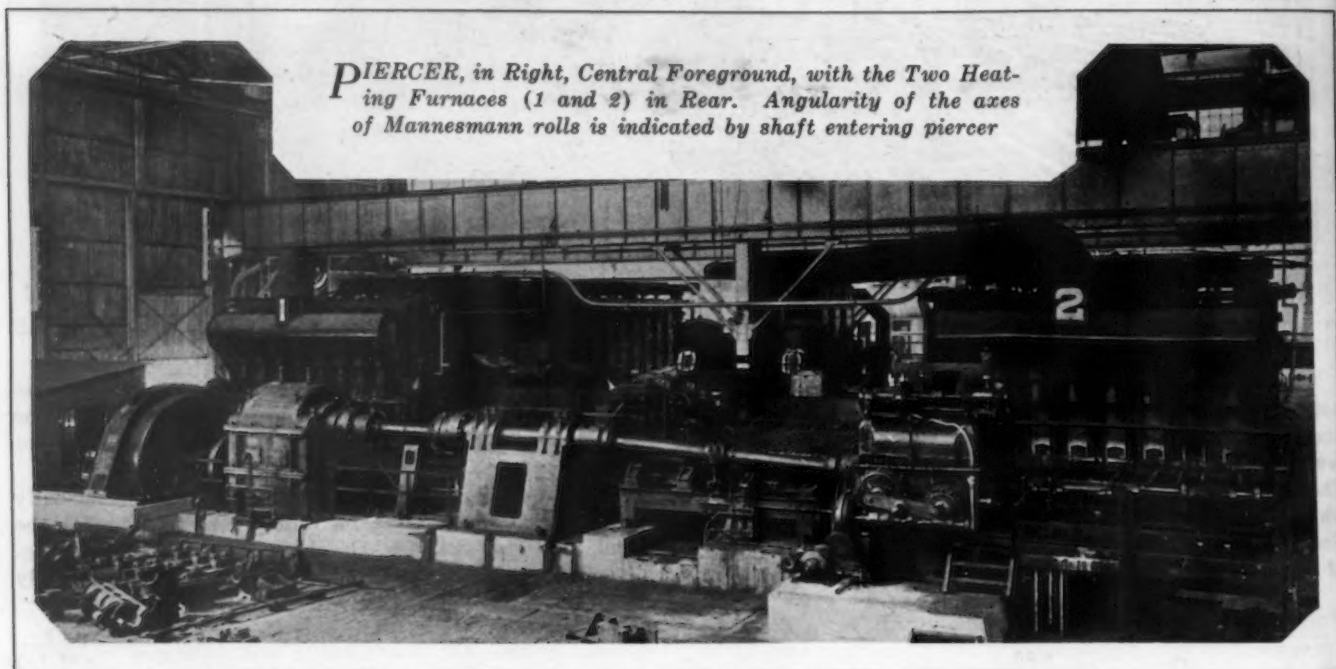
Successive Sections, from the Round Bar to a Completed Pipe

eliminated. All parts were made readily accessible and were so arranged that the vision from the operators' pulpits would be as unhampered as possible.

It was a departure to use two piercers—the second of which is called the expander—for this work. Many mills have only one piercer; this results in a much more severe action on the steel, and one which the Jones & Laughlin en-

Several operations, accompanied by exceptionally severe inspection, follow the cooling of the pipe after it has been made to size. All the pipe made goes through the straightener, which is of the conventional roller type and takes out any kinks or curves which may be in the pipe as it leaves the cooling racks. The straightening mechanism removes the scale from the surface and gives the pipe a high finish, on which any defects which may exist show up plainly.

Inspection of the pipe after straightening includes the use of a ring-gage for determining proper size and a close inspection of every foot, inside and out, for surface flaws. If flaws are found near the end, a ring may be chalked around there to indicate the point at which the pipe can be cut off to eliminate the area containing flaws. Sometimes a flaw in the center will permit cutting two short lengths of



PIERCER, in Right, Central Foreground, with the Two Heating Furnaces (1 and 2) in Rear. Angularity of the axes of Mannesmann rolls is indicated by shaft entering piercer

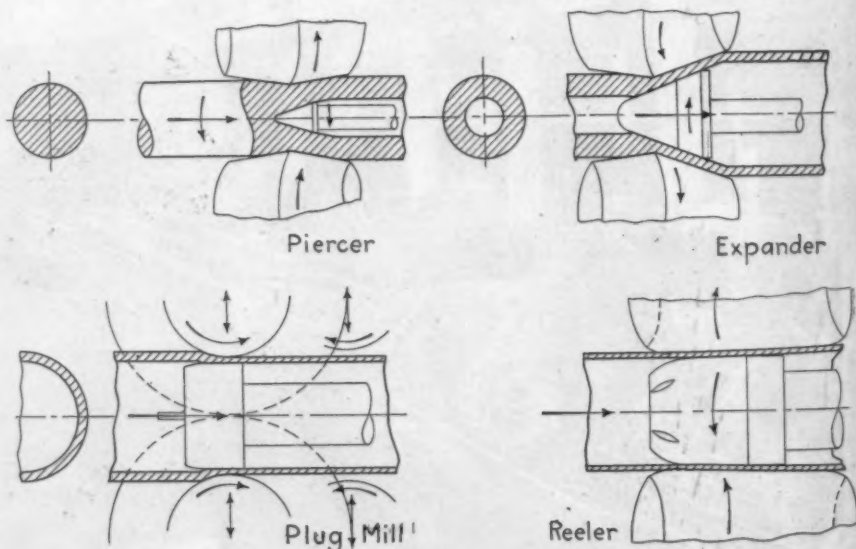
gineers believed would be injurious to it. Their experiments and experience indicate that a more nearly perfect pipe is produced by using a small round, piercing a small hole in it, and then expanding the piece through the second piercer, which is now the practice in that plant. For smaller size pipe, however, dimensional limitations of the product make it impossible, or at any rate inexpedient, to use more than one piercer. That accounts for the fact that only one is used in the mill on which the smaller sizes of pipe are produced.

Finishing the Pipe

TWO hours are required for the pipe to pass from the beginning of the cooling rack to the exit end. This rack is much longer than any other yet built. As the end of the two hours the pipe is practically cold. This procedure avoids internal strains in passing through the straightening process and at the same time insures a uniform grain structure throughout its entire mass. The forwarding chains on the cooling rack are fitted with small rollers like casters, which avoids marking the surface of the pipe, as might be done if it were slid on skids.

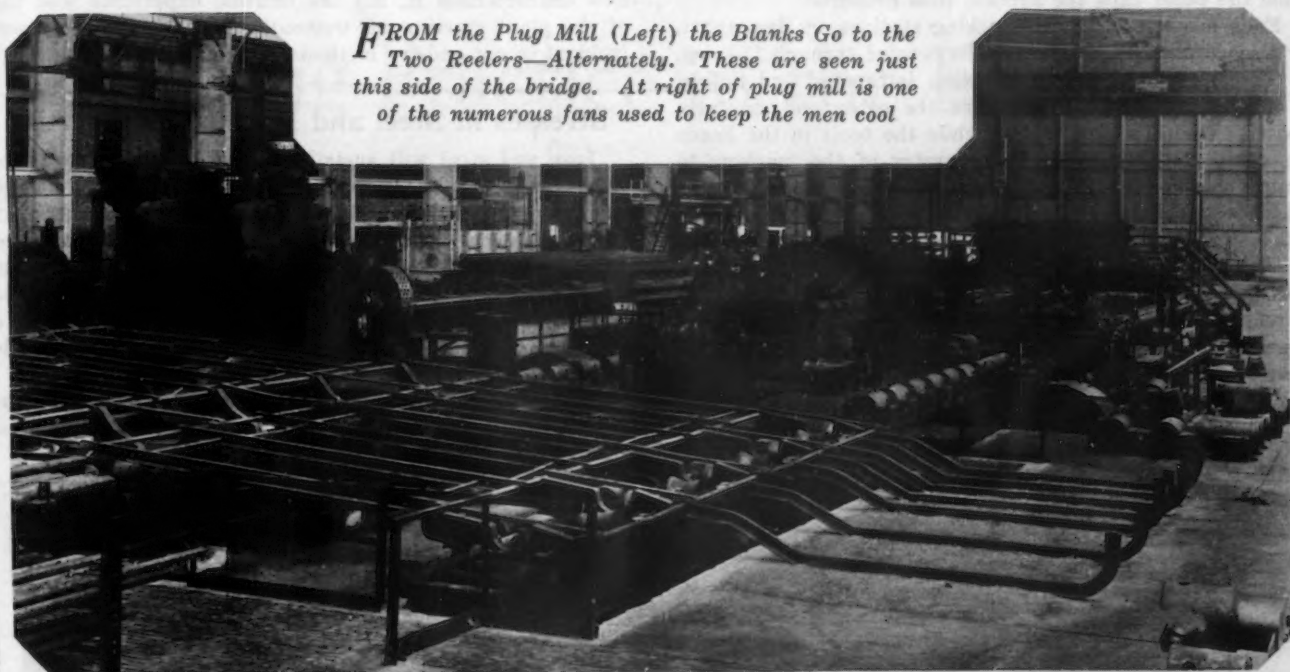
pipe, one taken from either side of the marked portion.

After passing through the cut-off machines, where the pipe has already been chamfered, it goes to the threaders and has threads cut on both ends. Hence, when it leaves the threaders, it is finished, but has to have a hydrostatic test.



Illustrating the Actions of the First Four Mills Operating on the Blanks and Showing the Mandrels and Plugs Used. Piercer, expander and reeler use "crossed" rolls

FROM the Plug Mill (Left) the Blanks Go to the Two Reelers—Alternately. These are seen just this side of the bridge. At right of plug mill is one of the numerous fans used to keep the men cool



A coupling is screwed on each end of the pipe, which then goes into the hydraulic tester and is subjected to a predetermined water pressure. A gage on the movable head of the testing machine gives at once the length of the pipe, which is thereupon chalked on it. One of the final inspection acts is to compare the weight of each individual length of pipe with the theoretical weight for the length chalked upon it, as a final check upon the accuracy of manufacture.

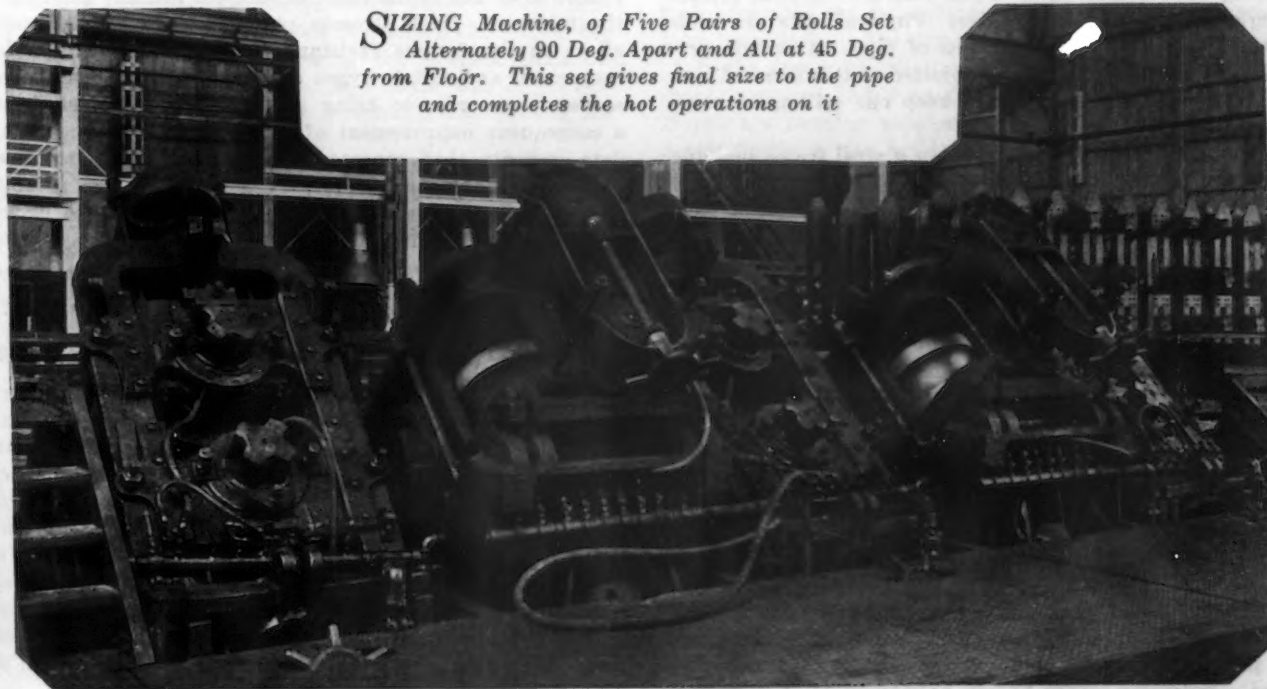
By the time the pipe has passed the weighing bench it has had from 10 to 12 separate inspections and is as nearly perfect as pipe can be made. Even the action of the threading machines is not taken for granted, but inspection of the threaded ends is one of the things always carefully done. Each length of pipe as it is shipped or stocked has a

coupling screwed on one end. On the other end, to protect the threads, is a thread protector, which will be removed when the pipe, at its destination, is about to be put into use. The pipe as shipped is covered with a coating to protect its surface from rusting.

Couplings Made from Larger Pipe

Making and inspecting the couplings for the pipe are just as exacting as making the pipe. These couplings are produced from pipe of larger size than that to which they are to be fitted. Such pipe is cut off into proper lengths for couplings, the length being one of the items immediately inspected. Blanks thus formed are run through one of four automatic machines, each of which has two working heads.

SIZING Machine, of Five Pairs of Rolls Set Alternately 90 Deg. Apart and All at 45 Deg. from Floor. This set gives final size to the pipe and completes the hot operations on it



One head bores the taper on the inside of the coupling, while the other taps the surface thus prepared.

Each machine has four chucking stations, 90 deg. apart, for the work. The chucks may be rotated through 180 deg. so that after one end of a coupling is tapered and tapped it may be turned over and have the other end similarly treated. There is ample time while the tools in the heads are doing their work for the operator of the machine to remove a completed coupling from an idle station and insert a blank in its place. The tapering head is automatically withdrawn as soon as its cut has been completed. The tapping head is fitted with a tap which is automatically collapsed, and then withdrawn, when the threads have reached a predetermined point. Every coupling then is inspected by screwing it upon a standard thread-plug and rotating it to make sure that the cut and tapping are truly concentric.

Careful and complete record is kept of all heats of steel

fore the equipment was running with the precision which now characterizes it, but the unusual experience was had of the plant starting off without all the long development incident to cut-and-try methods, as usually is the case.

Stresses in Steel and Magnetic Properties

Iron and steel will sustain certain stationary loads for an indefinite period. If the same load is repeatedly removed and reapplied, however, failure of the loaded member may eventually occur. Failure because of such repeated stresses is termed a fatigue failure, and no certainty exists as to the reasons for its occurrence, according to the United States Bureau of Standards, which has recently made a brief study of the effects of such stresses on the magnetic properties of steel.

In the few samples studied, the magnetic changes ap-



FINISHING Department, with Cut-Off Machines, Threaders and Inspection Racks Filling a Large Area. From the straightener all pipe passes through various stages here to reach the shipping shed

entering the seamless mill. From this the chemical composition can be secured at any time. Physical tests are made from pieces milled out of sections of pipe. A certain proportion of the pipe shipped is subjected to this form of test, which provides enough work to keep one milling machine constantly busy.

All of the machinery is housed in a steel frame building of generous proportions, with a special form of sawtooth roof, giving north light and providing what is for a steel mill an unusually high quality of natural light. The glass surface of the sawtooth is more than 20 ft. from top to bottom in each bay, the bays being about 100 ft. wide. The building housing the No. 2 mill, which is the one here described, measures 600 ft. in length. This building was extended for an additional 725 ft. to accommodate the No. 3 unit and the auxiliary apparatus on the finishing end. There is no wall between the two units. In consequence, the building now measures 1325 ft. long.

Design of the entire plant, which was developed primarily in the Jones & Laughlin engineering department, was based on a long study of various types of equipment and arrangement which were inspected, both in the United States and in Germany.

So careful was this study made and so well were the lessons learned that, contrary to all expectation, the new unit was producing marketable pipe the first day it was operated. Naturally, there had to be many adjustments be-

peared to be due to the relief of stresses initially existing in the material. Such stresses probably have a detrimental effect on the fatigue resistance of the material in which they exist, and certain types of heat treatment may be resorted to in order to bring about their partial relief and a consequent improvement of the material. The magnetic data indicate that repeated stresses, too small to cause failure, may also effect a partial relief of the internal stresses. Some of the beneficial effects of repeated understressing may be due to such stress relief. This subject is discussed in Research Paper No. 26.

Flame Cutting Harmless to Structural Steel

In an effort to learn whether flame cutting is detrimental to the strength of structural steel, the American Bridge Co. sent some typical wind connections from a 44-story building to the Bureau of Standards for test. When pulled in tension these specimens, cut from 24-in. I-beams, broke through rivet holes, and when bent under impact the only cracks appearing were short ones originating in burrs around punched holes. A report in *Engineering News-Record*, Nov. 1, concludes that "there is no evidence from any of the tests that fabrication by flame-cutting injured the material or had any influence on the strength or reliability of the connections."

Melting Practice in the Foundry

Prime Requisites in Getting High-Grade Metal with Minimum Fuel Consumption—Electric Furnace as Cupola Auxiliary

BY HENRY M. LANE*

THE prime requisite of all foundry operation is properly melted metal. In gray iron practice two melting methods have been in general use. These are the cupola and the air furnace. For many years the air furnace was relied upon to give a superior product and much attention was paid to its proper operation and the control of the metal by means of test pieces. This method is still used quite extensively for producing relatively large masses of uniform iron to meet high test requirements and more will be said later about the process in connection with furnace design.

The cupola has been the main dependence of the foundry trade up to the present time. The fuel was originally semi-bituminous coal or anthracite and later coke came into general use.

There have been many improvements in cupola practice and a good cupola operator should have a knowledge of what chemical reactions take place in the cupola. The cupola is probably the most efficient furnace from a fuel standpoint that has been devised by man. The melting is done in direct contact with the fuel, which is usually coke. The descending charge is preheated by the ascending waste gases. The metal and the ash are all melted and run out in liquid form, the ash as a slag. In the case of short heats the slag is sometimes held in the cupola and allowed to flow out when the bottom is dropped at the end of the heat.

In cupola practice it is necessary to introduce the air as a high-pressure blast to overcome the natural resistance of the material in the descending charge. Originally some form of fan was used and the pressure which it could produce was limited and this limited the possible height of the cupola. With the introduction of the positive pressure blower, cupolas grew in height and there was a greater opportunity for preheating the descending charge and the saving of fuel.

The bed charge in a cupola serves simply as a stage to support the balance of the material during the melting operation. The bed, however, must be brought to melting temperature at the beginning of the heat so that it will not have a chilling effect on the metal. When metal is confined in the cupola and subsequently tapped into a ladle it is necessary to have storage capacity in the cupola and this metal must be stored within the coke bed and hence it is in an excellent position to take up sulphur or other impurities from the partially burnt coke of the bed.

The part of the bed below the tuyeres acts as a stage or support throughout the entire heat. The part between the tuyeres and the melting zone is the active melting ingredient of the charge and enough coke must be added to it on each charge to compensate for the coke burned in melting each charge. If recourse is had to a forehearth or receiving ladle the bed can be reduced to a minimum and a decided saving made in coke.

To understand coke consumption and coke savings some knowledge is necessary of the chemistry of combustion. When the air enters the tuyeres, if the blast is properly proportioned, the oxygen present will all be burned to carbon dioxide gas and this reaction will give off 14,500 B.t.u.'s per lb. of carbon burned. This also gives a maximum possible temperature which is around 3000 deg. Fahr., and which makes possible the rapid melting in the melting zone.

Unfortunately above the melting zone the descending carbon in the form of coke becomes red hot and a secondary reaction takes place in which the carbon dioxide takes more carbon and becomes carbon monoxide. When one pound of carbon is burned to carbon monoxide it only gives up 4450 B.t.u.'s or approximately 10,000 B.t.u.'s less than are given up when a perfect combustion takes place. As a consequence the formation of carbon monoxide above the melting zone locks up heat and carries it up through the charge in the form of carbon dioxide. This gas burns at the charge door with a blue flame much to the annoyance of those who must work on the charging platform. Many attempts have been made to reduce the proportion of carbon monoxide.

Nearly 30 years ago the writer and Thomas D. West ran some tests on this in connection with which we wet the coke and by this means we were able to reduce the percentage of carbon monoxide at the charging door very materially and to our surprise we saved coke, but when we came to figure the matter we found that we had simply prevented the waste of coke. The ascending heat was ample to expel the moisture and turn it into super-heated steam. This in turn preheated the descending charge quite as well as would have been done by the dry gases.

In the past it has been quite a common practice to figure that it required 30,000 cu. ft. of air to melt one ton of iron. If you are figuring maximum blower requirements, this is a safe figure to use, but it is a very wasteful figure and is only arrived at in very poor melting practice.

In figuring the amount of air necessary for a cupola it must be remembered that coke is not pure carbon but carries approximately 12 per cent ash and hence at any given melting ratio this must be taken into calculation in figuring the air requirements.

If the formation of carbon monoxide could be entirely avoided we would melt iron with about 22,000 cu. ft. of air per ton, but this figure is very difficult of attainment.

In order to have figures comparable, the bed should be excluded from the calculations and the amount of coke between charges considered as the actual melting ratio. In most fair foundry practice this is taken as a ratio of 1 lb. of coke to 10 lb. of iron.

Fuel Consumption Affected by Type of Metal

THE amount of fuel necessary is also affected by the type of metal being melted. Where steel is added to the charge there are certain chemical reactions going on as the steel descends through the cupola. Steel in the cupola be-

*Foundry engineer, Detroit. A paper read before the convention of the National Foundrymen's Association, New York, Nov. 22

comes heated and undoubtedly takes up considerable carbon first from the carbon dioxide present and second from a solid carbon. This case-hardening action is increasing the carbon content of the steel and at the same time reducing its melting temperature. If the entire charge is made of steel it will pick up so much carbon in passing through the cupola that it is no longer truly steel but a low carbon cast iron. In order to accomplish these results it is necessary to maintain a very high temperature and the result is a lower melting ratio; that is more pounds of coke necessary to melt a ton of iron than are necessary when a soft grade of iron is being melted and the charge consists entirely of scrap and pig iron.

When cupola malleable is being made a still higher temperature is required and all of the carbon must be combined with the iron, and the result is a still lower melting ratio so far as pounds of iron per pound of coke melted are concerned.

With the old fashioned cupola the main savings which could be accomplished resulted from a careful selection of the proper kind of coke and the wetting of the coke.

Engineers have approached the saving problem from several other angles, all of which looked toward the conservation of heat. There was a Frenchman by the name of DeClercy who brought a cupola to this country 20 years ago in connection with which he had an auxiliary wind belt two or three feet below the charging door, from which he drew a certain proportion of the products of combustion and these he combined with additional air in the blower. His object was to dilute the carbon monoxide to such an extent that it would not burn or explode. The result was the preheating of the blast to around 200 deg. Fahr. and the return of a very small proportion of carbon monoxide to be burnt at the tuyeres. His cupolas did show very good savings, but it required a careful operation, and when the writer visited his foundry in Paris a few years ago this cupola was not in use at the home of its inventor.

The next important step was taken by Bradley Stoughton in his attempt to substitute oil for a portion of the fuel in melting. With this arrangement, oil was burned either in the auxiliary chamber, and the product of combustion introduced through the tuyeres with a small excess of oxygen, or was introduced directly into the tuyeres with oxygen sufficient to burn the oil plus a small amount of coke. Theoretically this arrangement was supposed to give a higher temperature in the melting zone and to reduce the amount of coke necessary. With coke fairly high priced and oil at a low price, as it was on the Pacific Coast some years ago, quite a saving can be shown with this style of melting, but the difficulty was to maintain the rate of oil flow and the excess oxygen on the one hand and the amount of coke added to the bed on the other so as to keep the bed at the proper height and avoid the oxidization of the iron. The nicety of the adjustment made it impossible to run this type of cupola with the same grade of labor which operated the ordinary coke-fired cupola, and this factor eliminated some of the plants, while the rising price of oil as compared with the coke eliminated others.

Powdered Coal as a Cupola Fuel

THE Whiting Corporation has recently been carrying on some interesting experiments in the use of powdered coal as a cupola fuel. In this case the coal is burned in auxiliary combustion chambers outside of the cupola and the products of combustion, together with a slight excess of air, are introduced through the tuyeres. As in the oil fired cupola the bed must be built up at a rate proportional to the excess of air introduced.

Both the oil fired cupola and the powdered coal cupola introduce one additional element into cupola practice and that is the presence of hydrogen in the combustible gases due to the presence of hydrocarbons in the auxiliary fuel used. This may not be wholly an unmixed blessing on the

one hand, the resulting components may break down to oxidize the descending charge, while on the other hand the burning of the hydrocarbons certainly will prevent the excess of CO gas in an all-carbon fuel.

Many engineers have looked for some way to utilize the waste heat, and recently there has been put on the market a hot-blast cupola which is turned out by the Griffin Engineering Co. and which was developed in connection with the plants of the Griffin Wheel Co. In this arrangement an auxiliary air belt, similar to the one in the DeClercy cupola, is placed a few feet below the charging door and a certain proportion of the products of combustion are extracted at this point, but unlike the DeClercy arrangement, no attempt is made to return these products of combustion to the cupola. On the contrary, a practice similar to that followed in blast furnaces is resorted to, and the material exhausted is burned with the addition of a small amount of oxygen and used to preheat the blast. The preheating arrangement is known as a stove. The products of combustion from the furnace pass up through pipes about which the incoming blast circulates. It is necessary to have an exhaust fan to take the products of combustion from the stove and blow them into the open.

This arrangement not only returns to the cupola a portion of the sensible heat present in the gases which have been exhausted, but also the heat made available by burning the carbon monoxide gas exhausted. With this arrangement the blast is heated to from 400 to 500 deg. Fahr. before it enters the cupola. This results in a more rapid combustion at the melting zone and in a higher temperature at the melting zone; also, if you attempt to maintain the same temperature, it is necessary to burn less coke to accomplish the results and hence there is a considerable saving in fuel as well as in the assurance of constant conditions in the melting operation.

There is no reason why the hot-blast system above outlined cannot be combined with the General Electric Co.'s control of the ingoing air and this should result in very efficient cupola practice.

Development of Special Furnaces

Many different types of special furnaces have been evolved to try to improve the quality of iron or to cheapen its melting.

In the air furnace group, attempts have been made to put a high chamber at the back end of the furnace, where a large amount of scrap was piled up, so that it could melt down as the heat progressed. In this connection a type of furnace known as the Pittsburgh furnace was developed and usually in charging a furnace of this kind small but heavy scrap was piled in toward the fire box and then the high part, or "kitchen" as it was called, was piled full of heavy scrap, pig and miscellaneous material. Melting always commenced near the bridge wall and progressed back toward the stack, so that the material in the high part of the furnace was melted down last by the heavy flame.

In like manner, air furnaces have been arranged to operate with oil, powdered coal or other fuel and provided with a stack or cupola at the back in which the real melting took place, the hearth being in use for superheating or for any refining.

In connection with the cupola, as has already been mentioned, a forehearth or receiving ladle is of advantage and in recent years this device has been used to reduce the sulphur by adding an alkali to the forehearth. This method is particularly useful where the cupola is used for melting metal for duplexing to electric furnace.

Use of Electric Furnaces in the Foundry

SO far as iron melting is concerned, electric furnaces divide themselves into two classes known as direct arc and indirect arc furnaces. In the direct arc two or more electrodes are usually arranged in a vertical position

and an arc is struck between them and the charge, the current passing through the charge.

In the indirect arc the electrodes are in a more or less horizontal position and the arc is struck directly between the electrodes without any contact with the charge. The indirect arc type of furnace lends itself particularly to a rocking operation, in connection with which the part of the lining heated by radiation from the arc is rocked under the molten bath, serving to superheat the bath.

The first operations in this country in making gray iron in the electric furnace used the direct arc type furnace and experimented with the melting down of an all-scrap charge. Some of the first experiments used a basic lined furnace and a second slag for reducing sulphur. In later operations an acid lining has been used and no attempt made to reduce sulphur in the electric furnace. Where scrap with the possible addition of pig iron is melted from cold metal in the electric furnace there will be no pick-up of sulphur and it is quite easy to control the amount of sulphur in the final castings. Where duplexing involving the melting of the iron in the cupola and the heating of it in the electric furnace is employed sulphur may be reduced in the forehearth of the cupola by treatment with a suitable alkali.

With the direct arc type of furnace the question of whether this process will pay depends upon several factors. On the Pacific Coast the relatively high price of coke, the low price of electric current and the low price of scrap make an electric furnace production of gray iron a very attractive proposition. In the East, at any point where electric current is particularly cheap it may be an attractive proposition.

Scrap Melting by Century Electric Co.

One exceedingly interesting case is that of the Century Electric Co., St. Louis. This company has a large percentage of very low-carbon steel scrap from the laminations of its motors and with this material as a base it has been making a synthetic gray iron. The process consists of having a baling press into which a certain amount of sheet metal was placed; then they put in a bag containing some cast iron borings, some carbon in the form of scrap from the carbon works and the necessary alloys of ferrosilicon and ferromanganese. They then introduce some more steel and press the entire mass into a bale or block which is charged into the electric furnace. With this is also charged the return scrap and sprues from the foundry and a small amount of coarse steel punchings. The entire mass is melted down into a high grade of gray iron. It is found that this metal is of essentially identical chemical composition with the cupola metal used formerly and is 20 to 25 per cent stronger. This additional strength gives a decided reduction in the breakage of delicate castings during machining operations and during shipment.

In the case of the Century Electric Co. the use of the scrap in the same building in which it originated saves transportation charges and the foundry is arranged on such a schedule that the furnace keeps off from the line during the peak load period. The result is a very nice melting arrangement, an improved product of iron and a reduced cost of castings of approximately \$30 a ton.

The company then decided to build a foundry to take care of its entire output, but here it immediately encountered the following factors: The new foundry was to be a continuous pouring unit with a conveyor system. If sufficient electric furnaces were put in to handle the entire output in a single molding shift the electric current charge would be unduly high if the molds were all made in one period, put on the floor and the furnace and shakeout gang worked throughout the 24 hr. there would be a big investment for building and poorer molding economy, which would more than offset electric furnace gain. In the old location the single electric furnace in use formed but a small part of the total load of the factory. In the new location the electric furnace would be a considerable portion and as a

consequence it was decided to use the cupola method for the bulk of the castings.

There are three methods in common use operating electric furnaces of the direct arc type; two of these methods have been in use for some time and the third has recently been put into commercial operation. In the first we have the direct melting of batches of cold metal either of approximately the composition required or the making of synthetic iron by the addition of carbon and alloys. In the second process we have the duplexing in which metal is melted in the cupola and superheated and refined in the electric furnace with or without the addition of alloys. In the third process a fairly large electric furnace is used, say of seven or eight tons capacity. In the morning a full batch is melted. Throughout the day ladles of say 1000 lb. each are taken from the furnace and a corresponding amount of cold material charged immediately. This material will be melted and incorporated in the bath by the time the next 1000 lb. is poured out. This continuous process is now in use and giving excellent results.

Electric Furnace Has Some Advantages Over Cupola

ELECTRIC furnace iron has a few advantages over cupola metal. The superheating of the metal makes possible its better deoxidization, the freeing of it from gases and the better combining of the carbon with the metal, which results in a product that weighs more per cubic inch than cupola cast iron, has a finer grain and will run 25 per cent or more above cupola metal in strength, even though the composition be the same. Also, this hot metal casts with less loss and particularly with fewer blowholes. As a consequence, the loss of castings in the machine shop is greatly reduced, machining qualities of the metal are also more uniform, and in most cases metal of a given composition seems to machine easier, which is probably due to the finely divided state of the carbon.

In the United States there are at present probably no locations east of the Rocky Mountains where electric furnace iron will not cost more than a corresponding cupola product, but one concern which machines its own castings has proved that, while the electric iron costs \$10 a ton more than cupola metal the final figures show that castings in the finished product cost \$21 per ton less for electric furnace product than for the cupola product. The difference is largely made up by the fact that with the electric furnace product there is so much less back charge for machining defective castings.

Electric current in the East will cost from a little less than 1c. per kw. hr. to approximately 1½c. with an average slightly over 1c. Roughly in the direct arc type furnace current can be taken at an average of \$6.83 per ton, electrodes \$1.20 per ton; refractories 50c.; labor \$1.04, or a total of \$9.57. To this must be added a 5 per cent melting loss and overhead.

In one case we can figure a charge made up of 1000 lb. of cast iron borings at \$11.50 a ton; 300 lb. stove plate at \$13 a ton; 200 lb. forging flashings at \$11.50 a ton; 500 lb. No. 1 gray iron scrap at \$19 a ton. Adding this to the above charge would give us a metal cost of \$21.35 per ton for batch melting. If the charge had been made up of 50 per cent pig iron and 50 per cent heavy gray iron scrap the price would have been \$28.47 a ton. Owing to the fact that in duplexing the electric furnace only takes about 100 kw. hr. per ton we have a much lower electric furnace cost in duplexing and counting refractories and labor we can figure on approximately \$2.47 a ton for duplexing. For continuous cold melting in one case the figure amounted to \$21.94 a ton.

Advantages of Indirect Arc Melting of Borings

THE indirect arc furnace is usually of a rocking type and is not so well suited for melting down heavy or chunky material as is the direct arc, but for melting cast

iron borings or fine material it has distinct advantages over the direct arc type and there are today quite a number of plants of this kind in operation. An interesting fact is that by taking the borings from a given grade of cupola iron and dead melting them in an electric furnace you will obtain a metal of far superior quality both from a wearing standpoint, from strength and from machinability. As already explained this is probably due to the better form of the carbon, to the superheating and also to the refining action.

Where the rocking type furnace is used, the charge generally consists of the back sprues and scrap together with borings. Even where borings are badly oxidized they can be cleaned up, the oxide reduced to metal, giving a good high grade product, but of course the reduction of oxide is made at the expense of carbon and to maintain the same percentage of carbon in the mix it is necessary to add carbon in some form. Generally for carbon additions in any electric furnace petroleum coke or some similar relatively pure carbon is better than high ash coke and in many cases old electrodes or scrap from the carbon works may be used for this purpose.

Planning to Utilize Borings

One of the prominent motor companies has run extensive experiments during the past year with this type of electric furnace and is now planning to put in an extensive plant for utilizing its borings. Where borings originate in a given plant, there is a distinct saving in converting them on the same property and turning them out as high-grade electric furnace castings and under suitable conditions this can be done in competition with cupola practice. This is due largely to the saving effected in handling and the improvement in the quality of the product in addition to the low market value of the borings.

If an electric furnace unit is to be worked to maximum output, advantage must be taken of at least a 20-hr. load, simply keeping off from the power lines during the peak period in the evening. This necessitates either molding 20 hr. or storing the molds. It is evident that in the next few years this process of reducing borings will be used very

extensively by some of the large motor car manufacturers.

The Enot Foundry at Wayne, Mich., recently installed several small Detroit electric furnaces and turned out a line of high-grade castings on purchased borings. From a metallurgical standpoint the operations were thoroughly successful, but from a handling standpoint they decided that 800-lb. furnaces would be much better than the 300-lb. furnaces installed and this new installation is now being put in.

High-Grade Castings Made from Purchased Borings

It is perfectly feasible to work with commercial borings purchased in the open market and to work into them a considerable portion of steel borings and turnings, but the metal composition must be watched carefully and necessary corrections made by means of alloys or other metal additions.

A number of firms have adopted a physical test to check the chemical test. In this connection a step bar having various thicknesses ranging from $\frac{1}{8}$ in. or less up to approximately $\frac{3}{4}$ in. can be cast in an ordinary sand mold, cooled and broken and the operator will be able to judge his silicon and carbon balance very closely and this will enable him to make corrections to the bath without waiting for an analysis.

One concern has recently purchased and is now installing one battery of transformers with two electric furnaces. The transformers are arranged so that one of them can be used singly or they can be used in parallel. When used singly they operate a 350-lb. brass melting furnace. When used together they operate a 1000-lb. iron melting furnace. Both these furnaces, of course, can take a considerable overload in capacity. The iron melting furnace will be used for supplying a small continuous molding unit and the brass melting furnace will be used for taking off one or two brass heats at noon, for pouring the work molded in the morning and for taking off one or two heats late in the afternoon for pouring the balance of the work. Such combined units as this will be of great advantage to concerns having a certain amount of high-grade iron that must show special physical properties.

Fatigue Failures of Large Engine Shafts

THE importance of designing for alternating stress so as to avoid "fatigue failure" of steel shafting and other parts is emphasized in a recently issued report by a British accident insurance company. Broken machinery examined during 1927 included the following:

A rolling mill engine shaft, 35 years old, broke after 520,000,000 revolutions. Nominal stress 4000 lb. per square in. and an occasional maximum of 8500 when the rolls would jam. Break was in crank web 8 in. by 14 in., where steel had been overheated and had coarse grained structure.

A gas engine crankshaft, 20 years old, broke after 220,000,000 revolutions, under a calculated stress of 13,000 lb. per sq. in.

Another gas engine crankshaft, 14 years old, broke after 380,000,000 revolutions. It failed at the fillet between web and shaft, where stress was 10,500 lb. per sq. in.

Still another failure in a similar shaft at the same position occurred after only 20,000,000 revolutions at a calculated stress of 15,970 lb. per sq. in.

Several of the fractures recorded were due to bad or indifferent quality, or else to material damaged by improper heat treatment. For instance, a cracked billet was used for one shaft forging. During the forging operation this crack

had opened, but the damage was patched by autogenous welding, which failed, however, to reach the bottom of the crack. Another shaft of an expensive alloy steel containing 0.43 per cent carbon, 1.43 per cent of chromium and 2.83 of nickel, had been damaged by tempering at too low a temperature, so that it was excessively hard and brittle. It failed, in fact, after ten weeks' service in a gas engine, running at 1000 r.p.m.

Several instances are noted of shafts running for considerable lengths of time in a cracked condition. In one, the crack had extended halfway through the shaft before final failure. With the higher speeds now in general use, cracks may spread seriously in relatively short spaces of time, while in the days when engine speeds ranged from 35 to 60 r.p.m., a cracked shaft has been known to run for years.

In chromium plating, the tanks containing the chromium may be ventilated by means of large exhaust fans, which are connected to umbrella-like hoods over the tanks. The fumes are drawn back into a special chamber where the vapor is condensed and run back into the tank.

W. H. Barr Resigns from Presidency

National Founders' Association Elects Col. Thomas S. Hammond,
of Harvey, Ill., to Succeed Him—Convention
Discusses Variety of Subjects

WILLIAM H. BARR, who for 15 years has served the National Founders' Association as its president and who in that time has been one of the acknowledged leaders in the open shop movement in American industry, declined to stand for reelection at the convention of the association at the Hotel Astor, New York, last week, and was succeeded by Col. Thomas S. Hammond, president Whiting Corporation, Harvey, Ill. In recognition of his long service to the association, the members unanimously voted to pay Mr. Barr a bonus of a year's salary.

The affairs of the association were reported to be

in good condition, financially and otherwise, although there has been some loss of membership, due primarily to the tranquillity which has prevailed in employer-employee relationships in recent years.

Sessions of the two-day meeting on Nov. 21 and 22 were devoted to such commercial and technical subjects as foundry cost methods, industrial education, business prosperity and foundry melting practice. One of the outstanding features was a paper by Virgin Jordan, chief economist National Industrial Conference Board, Inc., on "Business Prosperity and the Basic Industries," which is reproduced on other pages.

Advantages of Uniform Cost Systems in Groups of Foundries

WHEN a foundry has educated its own organization to figure costs correctly it has done only half of its job, said John L. Carter, general manager Barlow Foundry, Inc., Newark, N. J., in a report on behalf of the association's foundry cost committee. The other half of the job is to educate its competitors.

"One of the conditions that frequently prevents us from getting a fair price for our product," said Mr. Carter, "is that some of our competitors do not know how to figure their costs, or do not figure them at all. Some time ago our Newark association sent out a blueprint to about 20 foundries and asked them to figure their cost on the job. The weight was given and the desired production was given. The estimates varied from 5c. to 15c. per lb. Similar tests have been made by other associations and the same ridiculous variation has been found. Can there be any doubt that some of these foundries did not know how to figure their costs?"

"If we assume that 50 per cent of the business you lose—or say only 25 per cent—is due to ignorance of cost on the part of some foundries, would it not be worth real money to you to teach those foundries how to figure their costs? And, if you and a number of other foundries in your district were all figuring costs by a uniform method, do you not think that a lot of ridiculous prices would be eliminated?"

"If some of your competitors are ignorant of accurate cost methods or sound economic principles, they can disorganize your market and make it impossible for you to earn a fair profit, no matter how efficient you are.

It is your plain duty to yourselves, your stockholders and your industry to try to educate your competitors to use scientific cost methods if any practicable way can be found to do this."

Group Plan for Figuring Costs a Success

Conceding that a uniform cost system on a national scale has not proved successful, although tried out by the American Foundrymen's Association, Mr. Carter said that uniform cost accounting in local groups has worked successfully, and he cited the experience of the Newark cost group to prove this. The Newark group plan has been working for five years; it employs its own cost accountant; the original group of six has grown to 12, and every member of it, Mr. Carter said, admits that it has improved conditions in the Newark district.

After the cost group had been working for two years a test problem was submitted to all members, and the bids on a specific job varied only $\frac{1}{4}$ c. per lb., instead of a spread of from 5c. to 15c., as was the case when a similar experiment was tried prior to the formation of this group.

"Our market has been stabilized," said Mr. Carter. "There is absolutely no price maintenance; we stop at cost. There is still competition among our members, but it is fair, honest, sound competition; it is based on efficiency. If one foundry is more efficient than another, gets more production or has a lower overhead, it will get a lower cost and can quote a lower price. But the guesswork—the wild, foolish

prices—are being gradually eliminated from the field.

Newark Plan Has Reduced Costs

"Another advantage of this local cost group plan has become of great importance. Periodically we get out comparative cost reports which show various items such as melting cost, cleaning cost, indirect labor, overhead percentages. No names are given, but you can compare your own figures with those of other foundries, and if you find your own costs are high on a particular item you know where to concentrate your efforts to bring this item in line with comparative costs of other foundries.

"You know the attitude of the ordinary foundry superintendent. He thinks he is the most efficient operating head in the country. He has all sorts of alibis. He says, 'My cleaning cost is down to rock bottom, and no one could get it down any lower.' But if you can show him that his costs on the comparative report are higher than the average, you can make some impression on him. And if you have a local cost accountant, as we have, who is in close touch with operating conditions in other plants, he will help to convince him. And when you convince him that he is high, he will go after that item of cost and find some way to reduce it.

Large Savings Effectuated

"A great many big savings by members of our group would not have been effectuated had we not had these comparative cost reports. In our own foundry we have saved about \$5,000 a year on cleaning cost alone. Another foundry found its bench jobbing division was showing a loss. Its di-

rect labor was high. By continued attention and replacing one or two molders, this loss was changed to a profit, a saving of about \$3,000. Another foundry found that its overhead on floor work was out of line. After six months' intensive work on this item, it was able to cut out 10 men, a saving of over \$12,000 per year. Every one of us has saved the cost of this work many times over.

"There are 25 or 30 of these local cost groups operating now in various parts of the country. They are a recent development—their number is growing. The establishment of more cost groups in other localities would greatly improve conditions in our industry. The main purpose of this committee is to promote the formation of such groups in as many foundry centers as possible. If you wish any advice or assistance in starting such a group we shall give it.

"If you wish to start a cost group, the first step is to have a talk with your best friend among the local

foundries. Sell him the idea and then call in three or four more and sell them the idea. Then jointly hire a cost man to install and operate your uniform system. You can either hire a man to give his full time to the work, as we do in Newark, or you may arrange with a consulting accountant to give part of his time to the job.

"You must, of course, agree on some system. We have no pet system to foist upon you. The important thing is not what system you use, but that all members of your group use the same system. If you operate a malleable or steel foundry, we recommend using the system sponsored by the Steel Founders' Society and the Malleable Iron Research Institute. The American Foundrymen's Association has also recommended these two systems. For gray iron foundries, there is no standard system as yet, but we hope to get a description of a system which has proved successful in some of these groups and have this available for your information. We hope

soon to get data on a system for non-ferrous foundries also.

Cooperative Action Will Solve Problems

"The trend of the times is away from individualism and toward cooperative action. The foundryman who insists on running his business with a total disregard of the interests of his industry is out of date. We have learned that we cannot solve all of our problems by ourselves. Some of them require joint action. In the field of employee relations, this became apparent years ago. The National Founders' Association has clearly demonstrated that only by united action can we hope to maintain satisfactory conditions in this field. This committee believes that the adoption of a uniform cost system by a group of foundries in each locality is the most effective and probably the most far-reaching step to improve conditions in each locality and in the foundry industry as a whole."

How Two Large Companies Handle Personnel Work

DISCUSSING foremen training and personnel work, L. A. Hartley, director industrial education National Founders' Association, related some of the high spots in two large plants. Much of his talk, which was illustrated by lantern slides, was based on methods used by the Ohio Brass Co., Mansfield, Ohio, which he pointed to as one of the best systems he has studied, although, he said, there are some others equally good.

The Frigidaire Corporation, Dayton, Ohio, has established six definite rules of conduct for all employees regardless of the nature of their duties. These rules, which affect thousands of workers, have received the test of time, and, in the opinion of Mr. Hartley, the aims of the management have been achieved in that the men become better on their jobs and their home life is happier. The six rules are as follows:

1. Follow instructions willingly.
2. Be clean and orderly.
3. Take good care of property and materials.
4. Work well from whistle to whistle.

5. Work every day you can and tell your foreman when you cannot.
6. Work well with others.

These are called "the six laws of good work." In this large organization every employee is expected to know them and continually to study their application. Group and individual instruction is organized with this objective.

Ohio Brass Co.'s Methods

The Ohio Brass Co. has applied these same rules a little differently, according to Mr. Hartley, having set forth the following seven questions which apply to every worker:

1. Does he do good work?
2. Is he dependable?
3. Is he careful?
4. Is he clean and orderly?
5. Is he punctual and industrious?
6. Does he follow instructions willingly?
7. Is he agreeable?

To stress the interest of the management in the home life of its employees, and also to stimulate the interest of the foremen in the outside activities of their men, the company

files answers to the following questions about each employee:

1. Is he single? Or married?
2. How many dependents?
3. Does he own his home?
4. Is he buying a home?
5. Has he group insurance?
6. Is he in a savings plan?
7. Has he ever made any suggestions for improvements?

Mr. Hartley said that the two plants mentioned have achieved remarkable savings in production, have noteworthy records in maintenance of equipment, their conservation of materials is unusual, their scrap or unusable product is exceedingly low, the plants are kept clean at little extra expenditure, orderliness is apparent, and accident records are very low. In addition, he said there was an unmistakable atmosphere of happiness.

These rules, he said, are the fundamental principles of industrial economy in these nationally known manufacturing institutions. Their intelligent application by and to all employees carries the interest in each other's affairs beyond the plant and does it without paternalism.

Conditions Today Call for New Type of Business Man

"THE New Forces in Business" was the subject discussed by Charles F. Abbott, executive director American Institute of Steel Construction, New York, who said that "the industry which grasps the full meaning of the new form of competition and adapts its policies to meet it will inevitably outstrip those who are unable to recognize the change which confronts them or who fail to place the proper valuation on public opinion as the controlling factor of industrial progress."

As in addresses which he has made to other conventions recently, Mr. Ab-

bott stressed "the sharp competitive struggle" going on today, and the need for more intelligent handling of the problems of distribution and of scientific marketing and selling. "This new day," he said, "calls for a new type of business man, whose ability to create new ideas, new policies and to assume leadership will be an essential qualification."

A modification of the Sherman anti-trust law, with intelligent interpretations, might relieve the situation which today confronts many businesses, said Mr. Abbott, but he added that the Sherman law is not alone

responsible for the new conditions, nor would its repeal remove the principal of present-day problems.

"It is becoming more and more apparent," he declared, "that production in important fields has outgrown the anti-trust laws of 40 years ago. Trade agreements which have for their purpose the conservation of a product for the best interests of the public or the saving of an industry would not necessarily come under the prohibition intended by the framers of the statute.

"Business men must learn how to regulate themselves if they wish to avoid state socialism. A manufac-

turer has as much right to legal protection as the consumer. He should be accorded as much protection from the vicious acts of his competitors as are consumers.

"Mergers, leading as they frequently do to monopolies, offer no solution of our industrial problem. Cooperation and coordination of effort do. Cooperative activity, aimed primarily at better merchandising methods, offers

the one assurance of prosperity under present conditions of industrial and business activity."

Dwelling on the importance of advertising as one means of solving the problems of marketing and distribution, Mr. Abbott said that "the steel industry is the only large and important industry that has failed to seek the benefits of a national advertising campaign to educate the public."

Inveighs Against Anti-Injunction Legislation

JAMES A. EMERY, counsel of the association, discussed the anti-injunction legislation now pending in Congress, known as the Shipstead bill, and another bill which would "substantially abolish the jurisdiction of the discount courts of the United States with respect to suits predicated on diversity of citizenship or cases arising under the Constitution, treaties or laws of the United States, thus leaving to such courts only their admiralty jurisdiction and that over copyrights, patents or suits to which the Government is a party."

Mr. Emery said that this latter

legislation would leave to the State courts all of that vast body of litigation involving the most serious questions of constitutional rights and also litigation between citizens of different States or between citizens and aliens, for which the Federal courts were primarily created.

"The very existence of a written Constitution," he said, "requires for its interpretation and enforcement a national judiciary, qualified by learning, temperament and character to make it effective in every part of the American nation."

John Alden Grimes, representing

the Internal Revenue Bureau, Treasury Department, sought the aid of the National Founders' Association in a program now being carried out by the Treasury Department to fix standard rates of depreciation on equipment and other physical property. The method of procedure followed by the department is to set up these rates on an equitable basis after a conference with an industry. One such agreement has been in force 10 years, he said, and no serious dispute has arisen under it. The need for such agreement on depreciation rates is the various methods employed by single units of the same industry, thereby confusing the Treasury Department in deciding what are proper charges and what are not.

Important technical papers were by Henry M. Lane, foundry engineer, Detroit, on "Melting Practice," and by H. V. Crawford, General Electric Co., on "Automatic Blast Gate Control for Cupolas." The paper by Mr. Lane will be found elsewhere in this issue. That by Mr. Crawford will be reviewed in a later issue of this publication.

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SECOND

New York and that part of New Jersey north of a line drawn from Lambertville to Point Pleasant and the Provinces of Ontario and Quebec in the Dominion of Canada.

J. L. Lonergan, Morris Machine Works, Baldwinsville, N. Y.
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THIRD

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C. H. Hoffstetter, Odin Stove Mfg. Co., Erie, Pa.

T. B. Wood, T. B. Wood's Sons Co., Chambersburg, Pa.

G. L. Coppage, Pusey & Jones Corporation, Wilmington, Del.

B. H. Johnson, Cresson-Morris Co., Philadelphia.



Col. Thomas S. Hammond, President, Whiting Corporation, Harvey, Ill., Elected President, National Founders Association.

H. F. Wahr, Mesta Machine Co., Pittsburgh.

FOURTH

Lower Peninsula of Michigan, Ohio, Kentucky, Indiana and West Virginia
William D. Hamerstadt, Rockwood Mfg. Co., Indianapolis.
W. L. Seelbach, Forest City-Walworth Run Foundries Co., Cleveland.
D. J. Grant, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.
L. W. Olson, Ohio Brass Co., Mansfield, Ohio.

E. A. Leary, Cincinnati Steel Castings Co., Cincinnati.

FIFTH

Illinois, Missouri, Oklahoma, Kansas, Nebraska and Iowa
Walter R. Medart, Medart Co., St. Louis.
C. N. Stone, Deere & Co., Moline, Ill.
A. J. Hartley, Hart Grain Weigher Co., Peoria, Ill.
J. W. Bettendorf, Bettendorf Co., Bettendorf, Iowa.
J. P. O'Neill, Western Foundry Co., Chicago.

SIXTH

Wisconsin, Minnesota, Upper Peninsula of Michigan, North Dakota, South Dakota, and the Province of Manitoba in Canada.
F. H. Clausen, Van Brunt Mfg. Co., Horicon, Wis.
R. P. Tell, National Brake & Electric Co., Milwaukee.
C. S. Anderson, Belle City Malleable Iron Co., Racine, Wis.
Fred S. Power, St. Paul Foundry Co., St. Paul.
E. C. Bayerlein, Nordberg Mfg. Co., Milwaukee.

SEVENTH

Virginia, North and South Carolina, Georgia, Florida, Alabama, Mississippi, Arkansas, Louisiana, Texas, and Tennessee.
D. B. Dimick, American Casting Co., Birmingham.
A. E. Hartwell, Hartwell Iron Works, Houston, Tex.
Charles R. Law, De Soto Foundry & Machine Co., Ltd., Mansfield, La.
R. C. Stobert, Hardie-Tynes Mfg. Co., Birmingham.
H. F. Griscom, Price-Evans Foundry Co., Chattanooga, Tenn.
Honorary Member of Administrative Council
O. P. Briggs, 812 Builders Exchange, Minneapolis.

Discussion of Open-Hearth Problems

Labor Saving Devices, Characteristics of Bottom-Making Material, Automatic Control of Drafts, Oil Burners, Regenerator Brick—

Among Topics at Pittsburgh Meeting

LAST week two of the main subjects taken up at the Pittsburgh Meeting of the Open-Hearth Superintendents' Conference were covered in *THE IRON AGE*, (pages 1294 to 1298). The remaining general topic has to do with the operation of the furnaces, this being reserved for discussion at the third session of the conference. As with the previous sessions, there were no papers read at

this closing technical session of the meeting. Reliance was had, rather, on a free discussion from the floor of the several topics as they came up. The chairman called upon various members for expressions of opinion and, after one topic had been exhausted, went to the next one. In the following paragraphs is a digest of the discussion on operating factors.

Operation of Open-Hearth Furnaces

BOTTOM making and patching, combustion control, nozzles, stoppers and regenerator brick formed the topics for discussion at the third session. There were some progress reports on the use of various devices and a general interchange of opinion on matters affecting the day-by-day operating side of the furnace problem.

Use of Dolomite Machines

Something of a progress report on labor saving by the use of these machines was made by several men, who previously had reported installing such equipment. One man who had been running somewhat short of labor in the shop did not save any men with the machine, but it made the existing force much more readily available when the shop was crowded with bunched heats. He found that the machine cut down the elapsed period between tapping a heat and putting in the next charge by an average of 10 min.

Other men reported taking off one man for each two furnaces, taking off two or three men to the turn on shops with 10 or 11 furnaces, etc. Some time was reported saved between heats. In one case this was 20 min.; the time now occupied being 25 min. against 45 min. previously. It was the general consensus of opinion that the machine prevents playing out the men. To save time with it, however, good crane service is necessary, so that there will be no delay in getting the machine into action at the moment the furnace is ready.

One man reported a saving of dolomite to the extent of 5 lb. for each ton of ingots. Others, however, stated that there was no appreciable saving on this score, as the men were likely to put more material on a patch and thus make a better job of it. Some of the belts were reported as lasting 25 to 30 days, whereas other speakers said they were getting 10 weeks to 3 months life. It was stated that it was necessary to start the machine operating just before the furnace door is raised, to prevent burning the belt

through radiation from the furnace. Some of the short-lived belts, however, were reported as having been abraded and not burned.

In the summer-time, with extremely hard operating conditions, men using these machines do not slack the job of making up banks, as there is no occasion for so doing. Furthermore, it is said that the material can be placed on the banks more accurately by the machine than is possible by hand.

Austrian vs. American Magnesite

This topic has been discussed repeatedly at these open-hearth meetings. Most of the speakers reported an inability to distinguish any particular advantage of either type of refractory as compared with the other. It was said, however, that commercial stocks of Austrian magnesite appear to vary so much in fineness that the generally uniform character, physically, of the American magnesite makes it a material preferable to use. One man reported getting better results and lower costs with Washington magnesite than with Austrian.

Another man, however, who formerly advocated the use of American magnesite, has changed his viewpoint and now uses no magnesite whatever. He previously put a veneer of American magnesite over the surface of the laboratory at week-ends and found that about Thursday or Friday of the next week he would run into trouble through cutting the banks. Now, however, he is using a prepared dolomite which will run a whole week and into the next one before any trouble begins. He uses more of this new material in weight per ton of ingots, but it costs less. Formerly he used about 34 lb. of magnesite for all purposes, representing 68c. on a ton of charge, and 85c. on a ton of product. Now he uses 40 lb. of the new material at a cost of 30c. to the ton of charge, or 37½c. to the ton of product. As a result his delays from this cause have been practically eliminated and he is able to schedule his heats

very closely, to meet the needs of the foundry.

Unburned magnesite brick was reported as having been put into bulkheads with very satisfactory results. One man fitted the bulkhead at one end of a furnace with these brick and used a metal-cased brick at the other end. He had to patch the metal-case end after 210 heats, but did not have to touch the magnesite end, even after a much larger number of heats. This magnesite brick is given a metal-case fitting on three sides of it, as indicated in the sketch on next page.

Some plants buy the brick with the metal case on, while others make the metal shells and put them in place themselves. It was explained by the representative of a refractory company that brick of this type, cased with steel on three sides and patented, are being put out. This brick has a chemical binder to hold the magnesite together. One speaker stated that he used these magnesite brick in making the bottom of a furnace 2½ years ago, and thinks that they must have worked all right because he has never heard from them since.

Automatic Control of Fuel and Air

No automatic control is fitted with the Isley furnace equipment, and one speaker thought that such control would involve a very complicated installation. It would be necessary to house in the fans and to arrange control of the air for each end of the furnace separately. Report was made on one furnace at the Homestead works of the Carnegie Steel Co., which is fitted for automatic control. This has a relay which throws the valves over, instead of ringing a bell as does the Isley control. In this case, however, the control is based upon a differential of temperature between the incoming and outgoing ends of the furnace, instead of being dependent solely upon temperature conditions at the hot end.

Keeping a furnace so well balanced that neither end gets hotter than the other was discussed. A good operator

can run a furnace and keep it balanced, but a great many men do not do it. It is in these cases that the form of control on the Isley and other systems is a distinct aid.

Reference was made to a plate glass furnace near Philadelphia, which has been operating for the past four years on a system of control whereby the low temperature at the ingoing end will operate the alarm as readily as the high temperature at the outgoing end. Resulting from this it is possible to keep the cold end from getting too cold and to reverse the furnace whenever either end reaches a condition calling for it. It is claimed that there has been a saving in this case of 25 per cent on refractory costs. The regenerators on this furnace have not

which he saw at the Krupp works, has a supplementary regenerator. In England the maximum regenerator temperatures encountered run about 1300 deg. C. (2372 deg. Fahr.), while a good many do not go above 1000 deg. C. (1832 deg. Fahr.).

An engineer present referred to the fact that for each ton of steel made about 2½ tons of air, and an equal volume of waste gases, are passed through the system. For this reason it is essential that accurate proportioning must govern the various passages through the furnace, beginning with the laboratory, then the ports, downcomers, checkers, flues, valves and stack.

Discussion of the CO₂ measurement as contrasted with measuring oxygen

520 deg. The air going to the furnace is thus heated up to about 1000 deg. About half of the waste gases go through this heater, while the remainder go directly to the stack. A fan, placed on the low-temperature side, is used for the gases, to overcome the resistance through the preheater. This is large enough to take care of peak loads. Another fan is used for the air, both being on the same shaft and run by the same motor.

It was felt, however, that the two should be run separately, so that the speeds could be varied to suit conditions. It was found necessary in this case to put a damper on the air side to get the temperature up to 1000 deg. in place of the 800 deg. previously obtained. This necessarily absorbed more power.

This plant is to be made the subject of careful study by the open-hearth committee of the Corporation, on the basis of running the furnace two weeks with the preheater, then two weeks without and so alternating throughout the next run of the furnace. Probably it will be found advisable in steady operation to change the preheat temperature given to the air at various times during the progress of an open-hearth heat. Otherwise, if this temperature is maintained, the amount of fuel burned might profitably be changed as conditions warrant.

Nozzles and Stopper Heads

Graphite stopper heads and the nozzle, on low-phosphorus steel of 0.08 to 0.10 per cent carbon, are cut in pouring the steel. The question was raised whether this cutting is greater than when killed or semi-killed steel is being made, or when steel of the same carbon content is rephosphorized. No difference on the rephosphorization was reported.

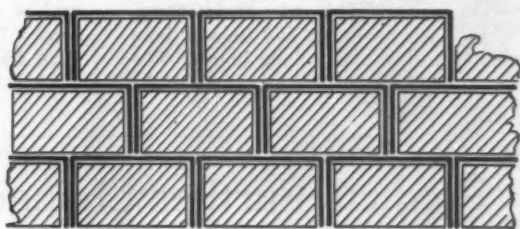
It was stated, however, that rimming steel cuts the nozzle more rapidly than does killed steel. One speaker qualified this statement by saying that this depends somewhat on the temperature, and killed steel can be tapped at a lower temperature than rimming steel and thus save on nozzle and stopper cutting. Another man thought that the greater cutting on rimming steel was due to the slower teeming of the heat. The chairman remarked that cutting is caused by relative absence of silicon.

Magnesite nozzle brick are not in use by any of the companies represented at the meeting. Nozzles of a combination of clay and graphite, however, were reported by one speaker as giving very good service.

Different Kinds of Regenerator Brick

At a previous meeting several men reported experiments under way on the use of silica brick in the upper courses of regenerator chambers, with fire-clay brick below. The Stevens furnace at Indiana Harbor has the upper nine rows of regenerator brick of the silica type. These were reported as giving just as good service

Illustrating Brick with Metal Casing Applied on Three Sides. As each brick rests on the metal of the one below, it is covered, all four sides, by metal



been rebuilt within the past three years.

If gas conditions in an open-hearth furnace remain constant, then the reversals of the furnace will be at pretty regular intervals. When the furnace is being driven fast, however, reversals may come so close together as to cool off the furnace during the many brief intervals in which the change is being made. This was suggested as being a case in which the regenerators are crowded beyond their proper capacity. One speaker expressed the opinion that reversals of the furnace should come at a time when the checkers have been saturated through and through with heat, center and sides being in the same condition. This in the general case should be at about uniform periods.

A man using the Isley system expressed himself as of the opinion that this probably is not the best method of control which can be worked out. It is being given a fair trial in his plant, however, and much is being learned. He believes that furnaces with inadequate regenerative capacity should be operated on short reversal periods. Longer periods can be taken when there is ample checker brick to absorb the heat.

A visitor from England, Edgar C. Evans, fuel officer of the National Federation of Iron and Steel Manufacturers, made some comments on the Mode furnace, which he had seen in operation in Germany. In this case the regenerators are 30 ft. deep and are made of special brick. The temperature measured near the furnace was reported fairly constant at 1500 deg. C. (2732 deg. Fahr.). Stack temperatures on this furnace were reported also to be constant at about 500 to 550 deg. C. (932 to 1012 deg. Fahr.). Another German furnace,

developed the fact that the measurement is ordinarily made on CO₂ recorders because they are commercially available, whereas no satisfactory oxygen recorder, practicable and workable, is on the market. Two speakers took the point that oxygen is the correct measuring stick for flue gases. The amount in the stack should be less than 2 per cent, and in the down-take less than 1 per cent. However, as both oxygen and CO run pretty nearly parallel with CO₂, it happens that the CO₂ measurement works out pretty well as a general guide.

Combustion Control on Reheating Furnaces

Soaking pits and other types of furnace used in reheating steel for rolling are being gradually adapted to the use of combustion control instruments. One speaker reported the use of a preheater on such furnaces where the regenerator capacity is inadequate. This is applicable also to open-hearth furnaces.

Such a preheater of the regenerative type, but with the air flowing always in one direction and the waste gases in the opposite direction, as in a recuperator, is reported to have been in operation intermittently during the last month of a furnace run. That it did not give what was expected of it is laid to trouble with the measuring instruments. On eight open-hearth heats, however, the average reduction in time of making a heat was from 1 to 1½ hr., when compared with 12 heats made previously on the same furnace but without the preheater.

This installation, which is in one of the plants of the United States Steel Corporation, takes waste gases, leaving the furnace at a temperature of 1400 deg. Fahr. or over, and reduces them to practically a constant 500 to

as the fire clay brick previously used.

In general, the speakers reported that the silica brick keep much cleaner, as the grit will not adhere to their surfaces as in the case of clay brick. One instance of this was shown, where five courses of $10\frac{1}{2} \times 4\frac{1}{2} \times 4\frac{1}{2}$ -in. silica brick occupied the top of the chamber and the furnaces were running from 250 to 300 heats before it was found necessary to blow out the accumulation of dirt. This compared with 190 heats average when clay brick were used throughout. The dirt goes down between the rider walls. There was no recovery on this silica brick when they were taken out after a furnace run of 420 heats.

Another plant makes a practice of using four or five courses of silica brick on top, but takes them out, without recovery, after 125 heats, and puts in a new lot. This gives new life to the furnace and speeds up operations generally. In another plant, however, with producer gas as fuel, the use of eight or nine courses of silica brick at the top of the regenerator was discontinued because the gases were hot enough to cut them away almost to nothing.

Another speaker, who uses a large block brick in the large regenerator chambers, uses 9-in. brick in the small chambers of the same furnace and reports that this new arrangement has put new life into the furnace and speeded up the production of steel.

Improved Types of Oil Burners

Divergent reports were made upon types of oil burners in use. One man spoke of using a patented type for several months, but running one gallon more oil to the ton of steel. Another man using a home-made burner put instruments on the furnace to obtain adequate draft control, and thus made an improvement of as much as 7 gal. to the ton; his consumption is now reported down to 25 gal. The draft is run at about 0.4 in. of water, whereas previously it was 1 to 1.5 in. This results in a certain amount of blowing out of gases around the doors of the furnace, cutting the front walls and jambs, but these furnaces have made runs of 769 and 860 heats respectively since the change was made.

Longer life is given to the checkers, and four-fifths of the brick from the checkers are reclaimed. These furnaces have a charge of $27\frac{1}{2}$ tons and make 27 heats in a week, the first one coming out about 7.30 Monday morning and the last one about 2.20 the next Sunday morning. This figures out about 5 hr. 20 min. to the heat in the 139 hr. involved. The oil pressure was given as 21 lb. to the square inch and steam for atomizing is used at 40 lb.

It was said, however, that much can be done on a 27-ton furnace which will not operate equally well on a furnace of 100 tons. The low draft condition cuts out both front and back walls, according to one speaker, who uses 60 lb. oil pressure and 80 lb. of steam.

Another man said that he is getting 450 heats on low-pressure oil and

steam from an 80-ton furnace, where he was unable to go more than about 275 heats on a run when using higher pressures. The heats are made in about the same time under the two conditions. His change was from 130 lb. pressure of oil to 45 or 50 lb., measured at the burner, and his draft was $\frac{1}{2}$ in. of water. His burner passes less oil to the extent of 50 gal. an hour and on cold metal he makes his heats with the use of 33 gal. to the ton of ingots.

Ladle Cars for Hot Metal

A brief report was made on the operation of three hot-metal ladle cars of the American Rolling Mill Co., which were put into operation June 2 last. These carry pig iron from the blast furnace at Hamilton to the open-hearth department at Middletown. The furnace produces 550 tons of iron a day, tapping every four hours. The ladles can take 150 tons, their light

weight being 145 tons. They are run on 16 wheels, there being four axles at each end. Electric operation on the trunnion is utilized to pour this metal into transfer ladles for the furnace. The ladles are used as a sort of mixer or storage, and iron has been held in some of them as much as 16 hr. without causing trouble.

To line one ladle requires about $6\frac{1}{2}$ turns of 10 hr. each. Only four men can work inside the ladle at one time. The lining of a ladle takes 6000 special brick, equivalent to 13,000 9-in. brick. These ladles have been running about five months, before relining, and carrying 40,000 tons of metal in that period. There is reported to be no skull loss in these ladles and only about $\frac{1}{4}$ per cent in the transfer ladles. Adding $\frac{1}{2}$ per cent of kish makes a total loss of about $\frac{3}{4}$ per cent. This ladle was illustrated in THE IRON AGE of June 21 last, page 1746.

Predicts Further Changes in Industry

William R. Basset, of Spencer Trask & Co., Foresees Reductions in Costs, Simplification of Business, New Methods of Selling

"GREAT as have been the basic changes in business in the past 15 years, I confidently look for greater changes in the next 15 years," said William R. Basset, partner of Spencer Trask & Co., investment bankers, New York, in an address at the recent convention of the Associated Business Publishers, Inc., at the Hotel Roosevelt, New York. Mr. Basset said further: "I do not pretend to be able to forecast just what, in detail, these changes will be. However, in their broader aspects they can be stated:

"1. Great reductions in all kinds of costs will expand markets.

"2. Business will be simplified in many respects. Outworn trade customs of many kinds will be discarded.

"3. Channels of distribution will be cleared of needless obstructions. New methods of selling will be devised. Perhaps the slot machine idea will be highly developed and used in many lines of retailing. Selling costs will be greatly reduced by more intensive use of salespeople and by more effective advertising.

"4. Discoveries in pure science will reduce the present markets for certain goods and open markets for new goods. Consumers will discard many of their present wants and develop new ones.

"5. Art will increasingly enter into goods.

"6. It is even possible that uneconomic costly competition will come to be frowned on instead of encouraged by the law.

"The editor of a business paper is better able to sense such changes than almost anyone else, for while a business man is properly immersed in his own business, the editor can be in in-

timate touch with many businesses in his own and affiliated fields and so be in a position to sense trends before they become generally apparent.

"The speed with which business will progress and general prosperity increase will depend to a large extent upon the ability of the business man to foresee these changes and adapt himself to them."

Slight Recession in Industrial Activity

Productive activity in the United States based upon electric energy consumption in 3600 plants showed a drop from 134.5 in September to 132 in October, according to *Electrical World*. Both figures are far above the 119.9 of October, 1927, and all figures are based upon the average monthly activity of 1923 to 1925 as 100. The average for the first 10 months of 1928 was 122.6, which is 6 per cent higher than the 115.8 average of the first 10 months of 1927.

Metal industries showed an advance in October to 144.6, compared with 143 in September. This advance was participated in by both the steel and the non-ferrous plants. This was offset by a sharp drop in the automobile field, including manufacture of parts, and by lesser drops in some of the other major industries listed.

H. C. Atkins Mfg. Co., St. Louis, has commenced publication of a monthly folder called "Nips," which aims to discourse interestingly about the things to look for in a good pipe nipple.

Locomotive Cylinder Planing and Boring Machine

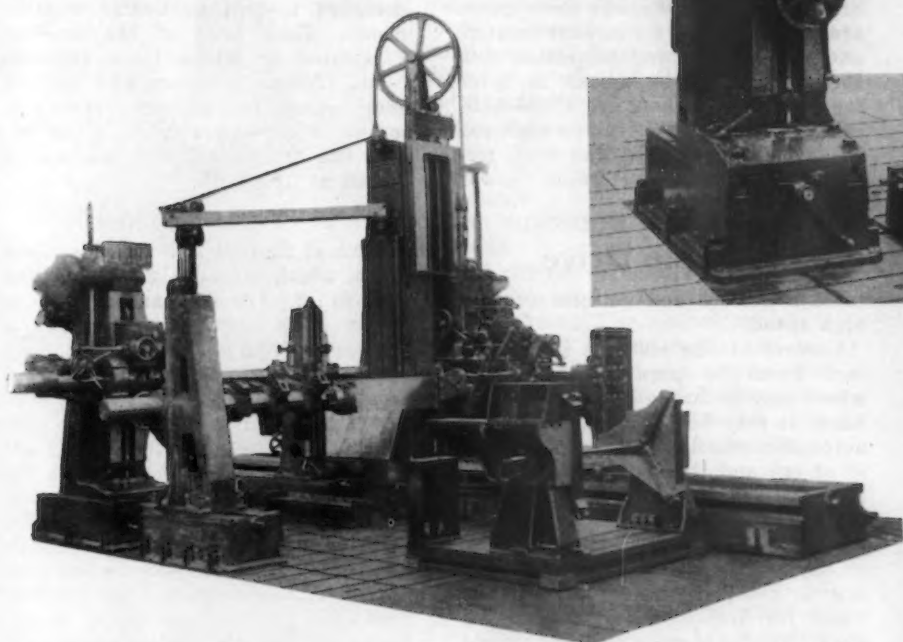
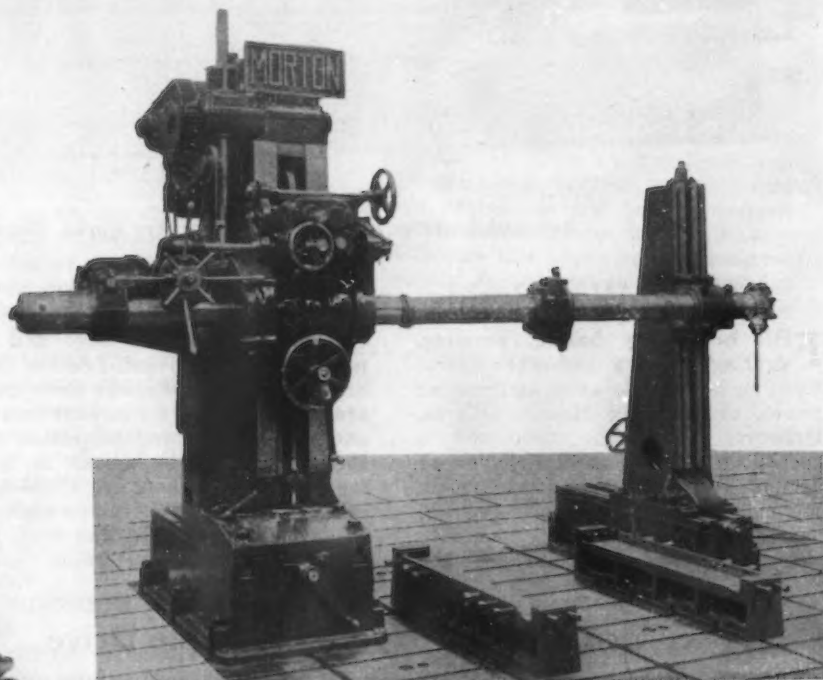
FOR the continuous machining of locomotive cylinders, the Morton Mfg. Co., Muskegon Heights, Mich., is offering the 72-in. stroke traveling head cylinder planing and boring machine here shown. All the planing, boring and milling operations are done by the one machine, the cylinders being completed except for drilling. The machine includes a piston valve boring unit and has capacity for the largest cylinders. When not required for cylinder work the machine may be used for a variety of planing, boring and milling jobs.

Cylinders to be machined are first placed in the floor chucks and made ready for the boring operations. The piston valve chamber is bored and faced by the piston valve boring unit,

5-in. boring bar, cutter heads and cutter support. The port milling attachment may be attached quickly to the square section of the ram without removing the standard planer head. A

matic horizontal feed is provided and there are six feed changes.

Parallels are provided for setting and leveling the cylinder for the boring operations, and provision is made for binding the cylinder. This unit is driven by a 7½-hp. motor, the drive



THE Complete Locomotive Cylinder Planing and Boring Machine Is Shown at the Left and the Horizontal Piston Valve Boring Unit Above. All machining, except drilling, may be done continuously, but when needed the machine may be used for other work

the main barrel being bored and faced at the same time by the traveling head unit. When boring is completed the cylinder is mounted in special cylinder chucks for planing and milling. The traveling head moves over to the work and on completion of the planing and milling it moves back into position for boring the main barrel of a new cylinder, which in the meantime has been placed in the floor chucks.

In general design the machine is similar to the company's standard traveling planers. When operating as a planer it has feeds either horizontally on the bed or vertically on the column, the horizontal feed being 18 ft. and the vertical feed 96 in. Automatic feeds for the ram, for boring and milling, are provided, and eight changes of feed in each direction are obtainable through a gear box. Boring and milling feeds are controlled by one lever. Power rapid traverse for all motions.

The floor plate is made in two sections and is approximately 15 by 20 ft. The chucks are of three-jaw universal type, the jaws expanding into the counterbore of the cylinder. The main barrel boring outfit consists of a

10-in. face mill is part of the regular equipment, and a one-piece work table, 30 in. high, 36 in. wide and 8 ft. long, is furnished. The push and pull cut head is threaded to fit either the planer head or the grip ring. The special extension head is designed for planing the upper frame fit of piston valve cylinders.

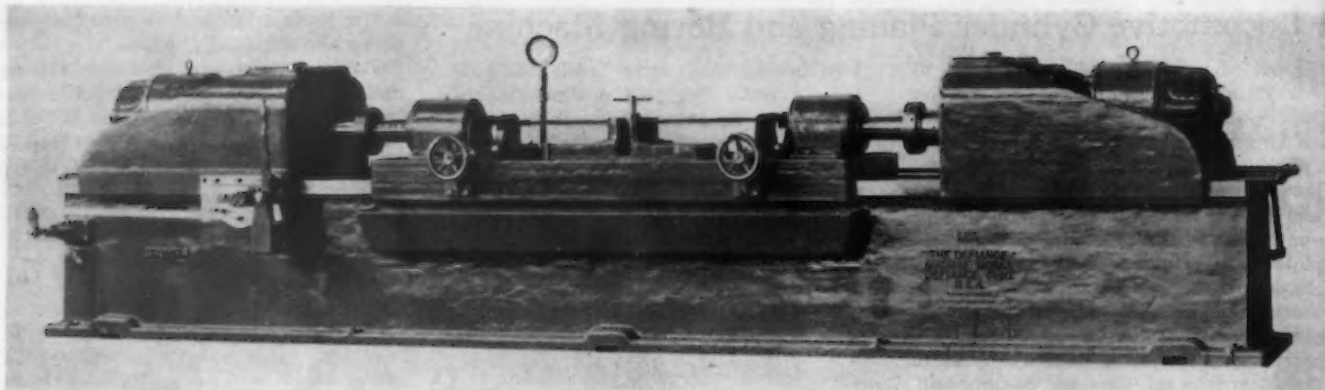
The machine is driven by a 10-hp. reversing motor, the power being transmitted through miter gears and vertical shaft to the operating mechanism in the vertically moving apron. The reciprocating motion of the ram is controlled entirely by the reversing motor drive. Longer beds and columns can be furnished and two traveling head units can be mounted on one bed, making a double traveling head cylinder planing and boring machine.

The horizontal piston valve boring unit, shown in the separate illustration and at extreme left in the picture of the entire machine, has a 5-in. diameter arbor. The outer bearing for the boring bar has vertical adjustment of 44 in. and horizontal adjustment of 24 in., the adjustments being made by hand. Scales are provided for settings on the column and bed. Auto-

being through silent chain, running in oil, to the gear box and friction clutch.

Features of the 13-in. and 16-in. double back geared quick-change screw-cutting engine lathes manufactured by the Porter-McLeod Machine Tool Co., Hatfield, Mass., are described and illustrated in a four-page bulletin issued by the company. The apron is double-walled and all gears run in an oil bath. The spindle is mounted either in bronze or Timken roller bearings. The quick-change gear-box, of unit construction, is bolted to the bed and is of such strength that feed changes, 40 of which are available, may be made while the lathe is under cut.

Easing of automobile manufacturing is continuing in November, according to *Automotive Industries*. Indications are that output for the month will show a decline of approximately 20 per cent from October. Manufacturing changes in a number of large producing factories in preparation for 1929 is in the main responsible for the reduction.



Automobile Axles and Similar Pieces Are Bored, Reamed, Drilled and Tapped

Two-Way Boring and Drilling Machine

FOR heavy-duty boring, reaming, drilling, tapping and other operations on automobile axles and similar pieces, the Defiance Machine Works, Defiance, Ohio, has developed a special two-way opposed, direct motor driven, horizontal boring and reaming machine with Oilgear feed. The machine can be furnished either with single or multiple-spindle heads. The

spindles are of alloy steel and are mounted either in anti-friction or in bronze bearings. Spindle drive gears are of stub tooth form, heat treated, and are inclosed and lubricated continuously either by splash or force feed. The large gears are of the helical type. The machine can be equipped with the Oilgear feed and with mechanical feed having rapid power

approach to work, then rate of feed desired, and with automatic rapid return. The length of the bed height of spindle centers and the fixture are designed to suit particular requirements. Each head of the machine illustrated is driven by a separate 5-hp., 1200-r.p.m. motor and the Oilgear pump by a 3-hp., 900-r.p.m. motor. Floor space is 64 x 228 in., and the weight of the machine is placed at 18,170 lb.

Face Grinder with Hydraulic Table Drive

OILGEAR table drive, permitting wide variation of speed to suit work of different materials and hardness, is employed in the type 74 heavy-duty knife and face grinder here illustrated, which has been added to the line of Bridgeport Safety Emery Wheel Co., Bridgeport, Conn. The machine is also equipped with automatic grinding wheel feed and the company's improved 26-in. sectional type wheel. Tables in 14 different lengths, from 50 to 206 in., can be furnished.

The table, speeds of which range from 0 to 90 ft. per minute, operates on 3½-in. wide flat self-oiling ways that are protected from grit. Thrust from the grinding wheel is taken against the broad flat side of the rear way. The Oilgear pump is piped to a reversible oil motor which drives the table through a short gear train and the work table rack. Reversal of the

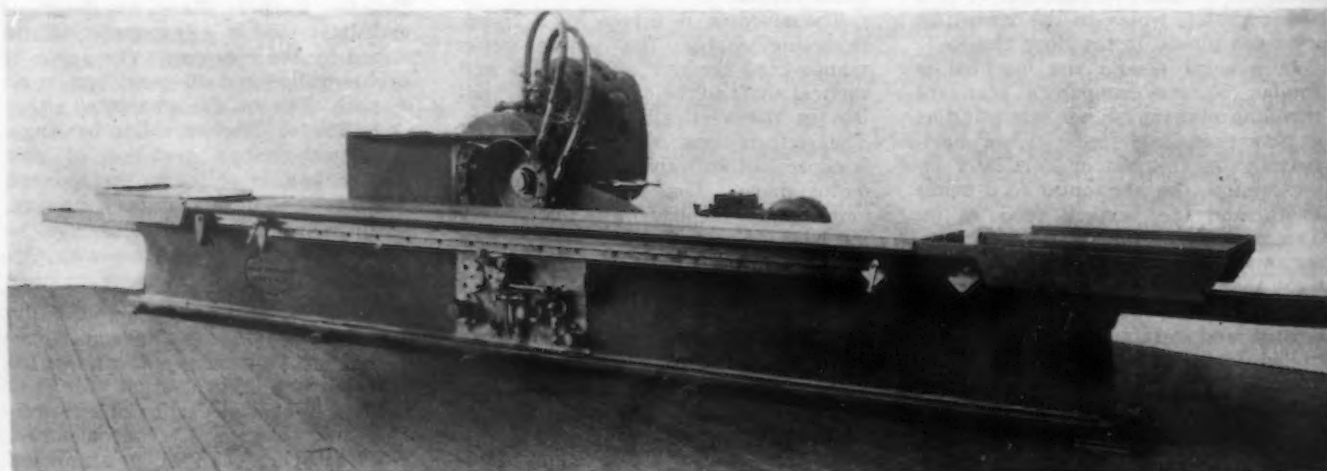
table is smooth and uniform even at high speed.

Control of the machine is centralized. From the operating position the wheel may be brought up or back by hand; it may be fed by hand, or the automatic wheel feed may be thrown in or out and the feed set by graduated dial to 0.00025 in. By depressing a foot treadle the operator may reverse the direction of carriage travel at any point or jump the "shipping" dog to bring the table clear of the wheel for unloading and loading the work. The table speed may be changed at any time merely by turning a hand-wheel and the table may be stopped by opening the bypass valve. Quantity and direction of coolant flow may also be controlled from the operating position.

Three driving motors are employed. A 15 or 25-hp. motor drives the grind-

ing wheel through a 5-in. wide silent chain, which is entirely inclosed and runs in oil. The Oilgear oil pump is driven by a 5-hp. motor through a flexible coupling and the coolant pump by a 1-hp. motor. Coolant is pumped from a 50-gal. two-stage settling supply tank which is arranged for convenient cleaning. Two large fully adjustable nozzles are provided at the grinding wheel. Thorough attention has been given to lubrication. Table driving gears and rack are splash lubricated, while the spindle bearings have large reservoirs and the grinding head lead screw is immersed in oil. Zerk high-pressure lubrication is used at other points.

The grinding wheel consists of 12 sections carried in a steel casting chuck. The sections or blocks are 8 in. deep and have 3-in. face, and it is stated that more than 7 in. of the sections can be used with safety. Provision is made for moving the sections



Hydraulic Table Drive Permits Selection of Speed to Meet Particular Requirements. Automatic wheel feed also facilitates operation

forward as they wear away, this being accomplished simply and rapidly. A complete set of alining shoes for obtaining proper alinement in setting up the machine are furnished. Equipment also includes either angle bar or revolving knife bar, and a magnetic angle bar, magnetic knife bar or magnetic chuck are available as extras.

Width of the table is 22 in., and the height 28 in. The total overhang

of the table beyond the bed rails may be one-fifth of the table length. The spindle is mounted in adjustable ball bearings. With sheet on guards at the ends of the table the floor space occupied by the smallest machine is 8 ft. 6 in. by 17 ft. 2 in., and by the largest grinder, 8 ft. 6 in. by 43 ft. 2 in. The weight of these machines, equipped with knife or angle bar, is approximately 9910 lb. and 19,080 lb.

Vertical Milling and Routing Machine

FOR die and tool room work and milling and routing in brass, steel and cast iron, the George Gorton Machine Co., Racine, Wis., is offering a new vertical milling and routing ma-

chine to 3000 r.p.m., are obtainable without back gears or without changing pulleys. Higher speeds can be provided for brass routing and for use of diamond tools. The machine is equipped with a foot treadle, a chip blower that is integral with the motor and a forming attachment for cutting curved surfaces. Changing of cutters is facilitated by a spindle pulley brake. Large diameter graduated dials permit accurate adjustment of the feed screws to fractions of a thousandth. All feed screws are covered and ways are protected. Rotating parts are dynamically balanced.

The ball-bearing spindle is entirely inclosed. It is machined from a solid bar of chrome manganese steel, hardened and ground inside and out, and is splined drive. The sleeve, which is hardened and ground inside and out, slides in a hardened and ground steel bushing. The height of the machine, which is designated as the No. 8-D, is 68 in. overall. The weight is 1600 lb.

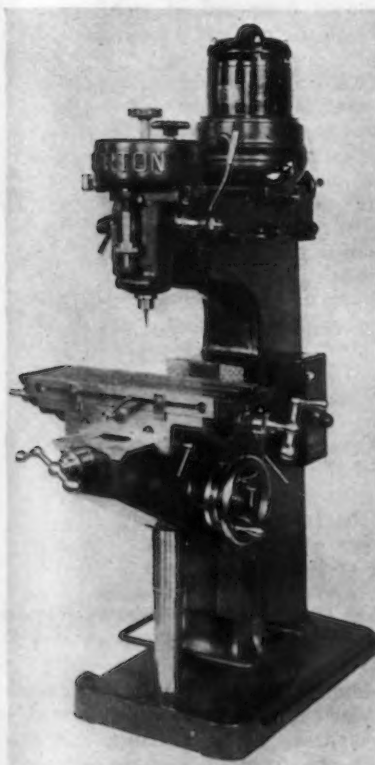
Industrial Radiator for Heavy-Duty Service

A RADIATOR to be used with engines of 200 to 300 hp. in industrial work is being put out by the Young Radiator Co., Racine, Wis. As the illustration shows, this is a large unit; it is said to be suitable for cooling engines of the power mentioned, in tropical plants or under severe

conditions in the oil field. It is built in several sizes, depending upon the horsepower required and the conditions, and is furnished either with or without fan equipment. It was designed especially for contracting work in the oil field, and where conditions render the automotive type impractical.

Screw Pump for Low Lifts

A RECENT development in pumping equipment for handling large volumes of water at low head is a self-contained vertical screw pump unit, which has just been announced by Fairbanks, Morse & Co., Chicago. Although this pump unit is designed mainly for irrigation and drainage service, it can be used for any type

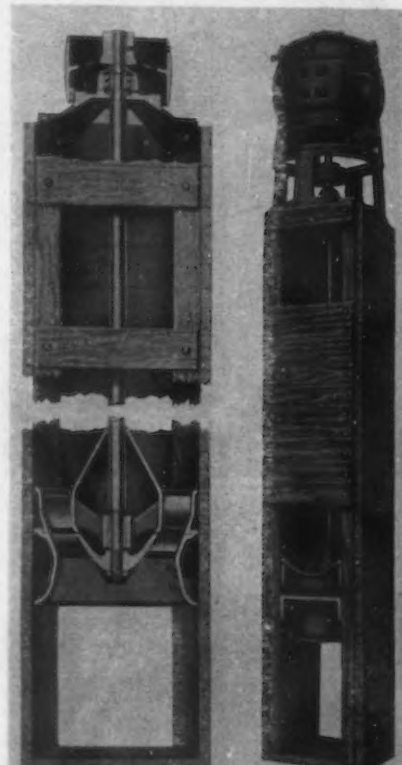


The Machine Uses Small Cutters at High Speeds. Sliding head is a feature

chine. The machine is designed to use small cutters at high speeds and although primarily for precision work, the machine is of rugged construction.

A feature is the sliding head which carries the spindle and complete driving mechanism. The minimum distance from the spindle to the column is 15 in. and the maximum distance is 30 in., the area of the working surface of the table being 15 x 22 in. at one setting of the work. The machine will swing a plate 60 in. in diameter and 4 in. thick or a cylinder 22 in. in diameter and 15 in. high. The maximum and minimum distance from the spindle nose to the table is 15 in. and 0 in. respectively.

The drive is by a ¾-hp. vertical ball-bearing motor and rubber V-belt. Ten spindle speeds, ranging from 475



This Self-Contained Vertical Screw Pump Unit Will Deliver 7200 Gal. a Min. Against an 8-Ft. Head

of pumping where the head is not over 8 ft. and where a low cost installation is desired.

The pump is a vertical machine consisting of cast iron spiders, carrying a wood screw type impeller and diffuser, and constructed in such a manner that four wooden corner posts are fastened to the spider and the structure boarded up so that it may be placed vertically in a ditch or stream.

Using a wooden box construction for the casing makes it easy to adjust the amount of lift or change the position of openings. The boards on two opposite sides of the box are permanently fastened to the frame posts, but those on the other two sides can be arranged to suit different operating conditions. These boards can be removed from the discharge side if a head of less than 8 ft. is needed.



Impressive Size Characterizes This Radiator

These boards can be replaced or removed according to requirements, and the pump always operates with a minimum amount of power. This feature, it is emphasized, contributes greatly to the efficiency of the unit.

This pump is manufactured in a 24-in. size. The inside dimensions of the box are 25-in. square by 12-ft. high. When driven by a 720 r.p.m., 25-hp. motor, the pump is rated to deliver 7200 gal. a min. against an 8 ft. head.

The reach of the machine is 48 in. and the lower horn is designed for 8½-in. and larger cylinders. The electrical rating is 150 k.v.a. and the maximum pressure at the die points is 2000 lb. A 1½-hp. driving motor is employed. Speeds of 21, 27, 37 and 51 cycles per min. are provided.

New High-Speed Milling Attachments

THREE vertical-spindle high-speed milling attachments adapted for manufacturing use have been added recently to the Brown & Sharpe Mfg. Co., Providence, line of milling machine equipment. They are designated as the No. 10 vertical spindle, com-

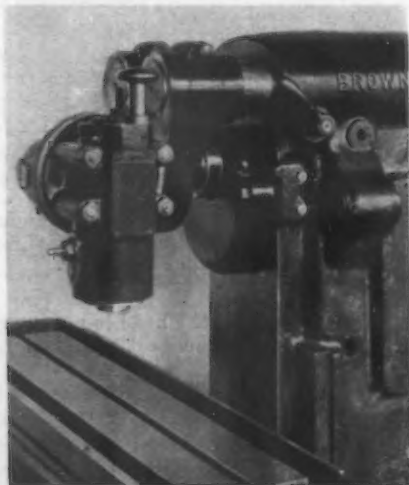
by hand before engaging the power feed of the table. The spindle is always in a vertical plane and has a hand adjustment of 2½ in. Adjustable stops regulate the movement of the spindle when milling duplicate pieces.

The high-speed compound vertical spindle attachment, which, except for the high spindle speed, is similar to the company's previous compound attachments, is for milling angular strips, tableways, etc., in which the spindle is set at right angles to the table. With the spindle in this position the full length of the table travel is available and an end mill can be used instead of an angular cutter for milling the angle.

Full universal movement, adapting the device for such work as drilling, milling angular slots and surfaces, cutting racks, milling dies, molds and other intricate tool work, is the feature of the high-speed universal attachment. This attachment is also provided with a hand-feed adjustment of 1½ in. which adapts it for angular boring or setting end mills into the work. All of the attachments are held securely in position by means of rugged clamps.



The Compound Vertical-Spindle Milling Attachment Is Above and the Universal Attachment Is Below



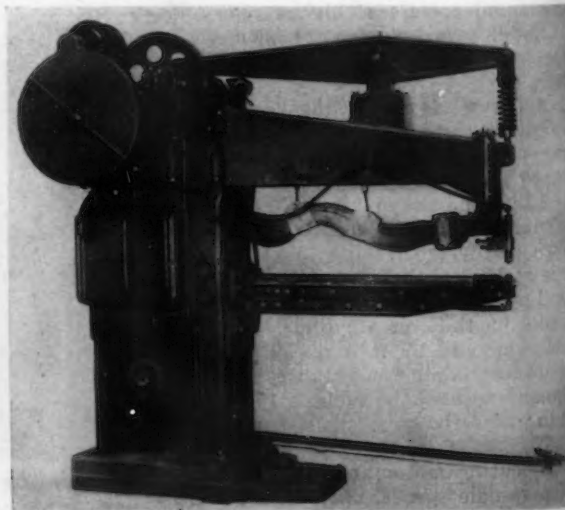
pound vertical spindle and universal milling attachments, respectively, and convenience of control, accuracy of performance and facility of application to constant-speed drive machines are features. Anti-friction bearings are employed for the spindle.

The No. 10 high-speed vertical-spindle attachment is for use where it is desirable to raise the spindle to clear the cutter from the work to facilitate loading, or for milling keyways, slots and other work that requires feeding the cutter into the work

Introduces Deep-Throat Spot Welder

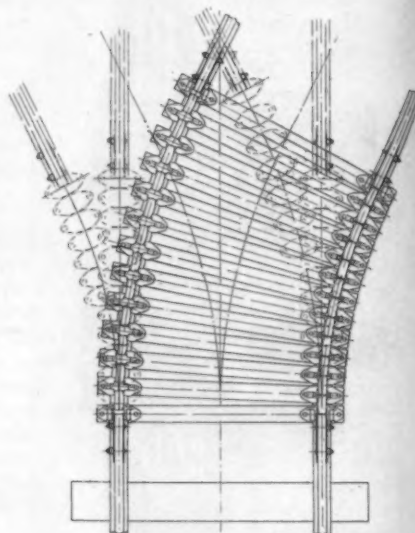
A NEW heavy-duty power-driven spot welder, designated as the No. 75-PA-48, has been added to the line of the Thomson Electric Welding Co., Lynn, Mass. Features of the new welder include unusual depth of throat and special construction of the lower horn, which adapts the machine for welding cylinders or tubes of small diameter.

Unusual Depth of Throat and Special Lower Horn Adapt Machine for Welding Small Cylinders and Tubes



Flexible Industrial Track

A FORM of industrial track including flexible units is being made by the Illinois Power Shovel Co., Nashville, Ill. Known as the Clarkson flexible rail, this device was designed to permit a machine mounted on a track to handle materials over a wide space where only a single track is available. The rail shown in the illustration is composed of small cast steel



Rail Which Can Be Bent as Required in Service

sections with stop ears attached. These rest in chairs mounted on cross-ties. Upon shifting this track into the form of a curve, as shown, the inside sections contract, while those on the outside let out, forming a curve of sufficient uniformity for practical purposes.

How Business Is Now Regulating Itself

Rules Adopted at Trade Practice Conferences with Federal Commission—Extent of Enforceability Not Defined

WASHINGTON, Nov. 27.—The trend of American business is toward self-regulation. One of the latest industrial groups to move in that direction is the Association of Manufacturers of Woodworking Machinery. This organization has proposed a tentative list of rules, which will be discussed with M. Markham Flannery, director of trade practice conferences, Federal Trade Commission, at a meeting in Chicago about the middle of December.

"Never in the history of American business has there been a time when self-regulation has received more intensive consideration," Mr. Flannery told a staff representative of THE IRON AGE. "By self-regulation I mean workable rules prescribed by an industry for its own business conduct, with due regard for the public interest. If an industry is capable of self-regulation the trade practice conference procedure of the Federal Trade Commission affords the most effective method yet devised to accomplish this end."

Self-regulation, Mr. Flannery pointed out, is not an innovation. It has been attempted with varying success for many years, it was explained, the degree of success attained in any industry being readily measured by existing competitive conditions therein. In the event that these conditions are all that can be reasonably desired the success attained is complete, but if practices still exist that result in unfairness or are otherwise bad, self-regulation has failed.

Self-Regulation Demands Means of Enforcement

"Trade associations, 'institutes,' the Chamber of Commerce of the United States and business organized in other forms have done and are doing excellent work," Mr. Flannery continued. "Competitive conditions in many industries are being studied and intelligently analyzed, codes are being adopted, much money is being expended in educating industry for the work of self-regulation. But when the faults are discovered and rules adopted for their correction, it remains for the trade practice conference to supply, in a measure at least, an element that heretofore has been completely lacking—namely, enforcement."

Self-regulation without rules would be impossible, Mr. Flannery said, and rules without some power of enforcement make self-regulation in some instances a mere expensive gesture. The fact that some power rests, as it does, in an impartial, disinterested

governmental body obviates the necessity for its frequent use, he said. To support this statement, Mr. Flannery cited the fact that of more than 300 rules adopted by industries in trade practice conferences, the power of the Federal Trade Commission has not been invoked with reference to a dozen of these. A complete study of the effect of past conferences, now being made by the division of trade practice conferences, may change these figures or disclose some additional reasons, but regardless of the showing on final analysis, Mr. Flannery said, the fact remains that the mere probability that any rule may be enforced adds materially to its general observance.

It was explained that in formal complaints issued by the commission against one who has violated a rule, the charge is based on violation of the statute, not on violation of the rule. Before considering the extent to which trade practice conference rules may be enforceable, Mr. Flannery dealt with the underlying principles and nature of the trade practice conference procedure.

Industry Entitled to Fair Competitive Conditions

It was pointed out that the primary interest of the commission naturally is the interest of the public, which is entitled to the benefits that flow from competition, while competitors are entitled to fair competition. Thus the legitimate interests of business are in harmony with the true interests of the public. Trade practice conferences, it was stated, afford a common ground upon which representatives of business or industry may meet and frankly discuss and agree to abandon any practices or methods which, in their common opinion, are unfair, harmful or against the public interest. This procedure deals with an industry as a unit and is concerned solely with practices and methods. It regards the industry as occupying a position comparable with that of "friend of the court" and not that of the accused. It bans, on a given date, all unfair methods condemned at the conference and thus places all persons engaged in the affected industry on an equally fair competitive basis. It performs the same function as a formal complaint without bringing charges, prosecuting trials or employing any compulsory process. Also it multiplies results by as many times as there are members of the industry who formerly practiced the methods condemned and voluntarily abandoned them.

Representatives of a given industry assemble in conference over which a commissioner of the Federal Trade Commission presides, looking after the interests of the public. The industry proposes, discusses and adopts resolutions defining and denouncing such practices as, in the opinion of the conferees, should be abandoned for the good of the industry. These resolutions, with a report, are submitted to the commission as a whole. Following consideration, the commission may approve, accept or reject the resolutions, in whole or in part. Resolutions approved or accepted by the commission are regarded as rules of business conduct for the government of the industry on the subjects covered. These are usually grouped according to the nature of the practices that they condemn.

Rules Adopted Fall into Two Classes

Group I rules are those that the commission affirmatively approves, thereby stating in effect that those who carry on practices condemned by such rules may be named as respondents in formal complaint. Group II rules condemn practices regarding whose illegality the commission expresses no opinion, but which it accepts as unfair methods of competition as interpreted by the trade. The rules in this group cover a wide range. They deal with practices whose illegality is uncertain, as well as those that may be regarded merely as bad business methods. The only statutory guide to the nature of practices that the commission by Section 5 of the Federal Trade Commission act is empowered to prevent is found in the declaration that "unfair methods of competition in commerce are . . . declared unlawful." Mr. Flannery cited the decision of the United States Supreme Court in the so-called Gratz case which stated that the words "unfair methods of competition" are not defined by the statute and that their meaning is in dispute. The opinion said that it is for the courts, not for the commission, ultimately to determine as a matter of law what they include. It was held that the words are "clearly inapplicable to practices never heretofore regarded as opposed to good morals because characterized by deception, bad faith, fraud or oppression, or as against public policy because of their dangerous tendency unduly to hinder competition or to create monopoly. The act was not intended to fetter free and fair competition, as commonly practiced by honorable opponents in trade."

Mr. Flannery said that the adoption of rules of business conduct at a trade practice conference by the majority of an industry, if free from collusion or fraud, determines the competitive practices that constitute "fair competition as commonly understood and practised by honorable opponents" in their particular trade. Any who violate their self-imposed obligation to abide by these rules, the adoption of which was based upon mutual consideration, and the good faith of all, it was declared, would appear to be guilty of "bad faith."

Enforceability of Group II Rules Still in Doubt

The policy of the commission, as officially announced with reference to this question, was stated as follows: "It is a matter of public impor-

tance that the question of the enforceability of Group II rules be judicially determined. To expedite such determination, the commission has taken the position that the clandestine violation of any Group II resolutions by one who has subscribed thereto in consideration of the like subscription by others in the industry is in and of itself an unfair method of competition calling for action by the commission, even though the practice condemned by such rule has not heretofore been held violative of the act by the commission or any court."

Commissioners Humphrey and Ferguson did not concur in the position taken by the commission. They believe that such enforcement is beyond the power of the commission.

As to the minority members of an

industry who refuse to subscribe to Group II rules, Mr. Flannery said, it is not now apparent how there could be enforcement against them unless the commission in considering a specific complaint should conclude that a proceeding could be sustained under the act, regardless of the rule. The public interest, it was declared, dictates that no rule should be received by the commission that would work an undue hardship on the public or on one who has agreed to abide thereby. Such a rule, if not rejected by the commission in the first instance, would be disapproved when its true character became known. Group II rules are usually observed and have resulted in the abandonment of many bad business practices, Mr. Flannery said, to the lasting good and financial benefit of industry.

Copper Industry's Progress Since the War

New Consumption Record This Year and Condition Now Better Than Ever

A COMPREHENSIVE discussion of the past, present and future of the copper industry was presented by William G. Schneider of the Copper and Brass Research Association, New York, at a meeting of the New York section of the American Institute of Mining and Metallurgical Engineers at the Machinery Club, Thursday evening, Nov. 22. His subject was "The Copper Industry; Its Progress Since the War."

The campaign of the industry to regain its normal status, lost as an outcome of the war, was discussed in the first part of the address, followed by an enumeration of the agencies by which recovery was brought about, Copper Exporters, Inc., the Copper Institute and the research association itself. The concluding part of the address covered the results which have been achieved and what they mean for the future of the industry. From this part of the address has been taken the following:

World Production Must Be Increased

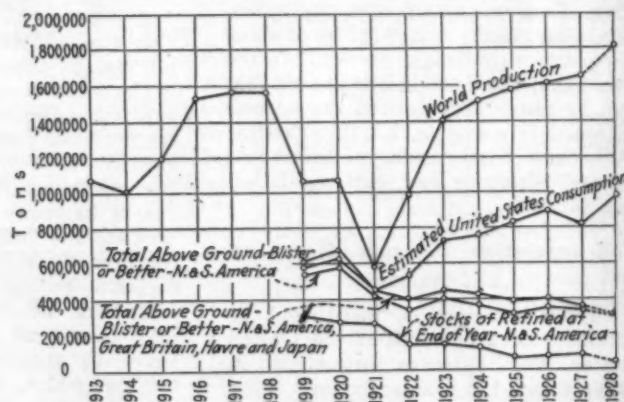
World production of copper from 1913 and including 1928 is shown in the illustration. It is estimated that for 1928 this will amount to about 1,840,000 tons. This is an increase of about 165,000 tons over 1927. The chart also shows the stocks of refined copper at the end of each year. It is believed that such refined stocks by Jan. 1, 1929, will be slightly above 40,000 tons, taking into consideration advance sales, and if it is at all possible to prevent it, in no event will they go below this level. Export shipments for 1928 also will show an increase and will probably total about 700,000 tons.

It is plain that the world produc-

tion of copper must be increased. It is estimated that by 1934 this must be about 2,240,000 tons, as compared to 1,840,000 tons for 1928. This means that the world will demand all the copper North and South America can produce from present mines, and will,

menace to the entire United States industry, but will be needed in the years to come to augment some of our own production. During the next few years a greater production of copper is absolutely essential, from the Southwest, far West and South Amer-

World Output of Copper and American Consumption and Stocks Over a Period of 15 Years



in addition, be able to absorb all the copper which Africa can produce by that time.

African Copper Not a Serious Menace

There is no question but Africa is a potential field, capable of producing large quantities of copper. At the present time African copper fields lack capital for the proper opening, on a sufficiently large scale, of known large deposits. There are also transportation difficulties, and I am sure that there will eventually be some difficulty in obtaining sufficient labor at the right price if many properties start producing. In my opinion, African copper is not such a serious

ican properties. It certainly will be needed, other conditions remaining normal.

New Record This Year in American Consumption

Estimated United States consumption is also charted. It is believed that during 1928 the country will have consumed close to 1,000,000 tons of copper, which is an increase of 160,000 tons over 1927 and 100,000 tons over 1926, and the largest ever consumed by this country in any one year. This consumption is sure to keep increasing unless the proper steps toward finding new markets or holding old ones are neglected.

I feel that for a long time to come

the copper industry will remember the past seven years and will not again let things "go by the board." The continuance of active sales promotion activities through its various associations is recognized by the leaders of the industry as absolutely essential and will be continued for many years to come. The foregoing data are based on figures compiled by the American Bureau of Metal Statistics, covering the first ten months of 1928.

There are markets for copper at any price, irrespective of whether it is selling at 12, 13, 16, 18, 20c. per lb., or even higher. An increase in price does not necessarily mean that curtailment of use must follow. There are needs which only copper can supply and here it will have to be used irrespective of price. There is also today a wider recognition of the merits of the metal, and it is hardly to be supposed that, because the price advances, the demand for it will fall off.

Higher Prices Will Not Affect Use

If one were to consider the use of copper in any finished commodity, I am certain it will be found that the value of the metal figured say at 16c. or higher, will have but a small influence on the retail selling price of the article in question. For instance, in an automobile selling around \$1,500, an increase in the price of copper of 5c. per lb. should only add about \$3 to the cost of manufacture. In an adding machine, selling for \$250, the added cost would amount to about 15c.; in an alarm clock, selling at \$4, it would add about 10c.; and in a \$15,000 house, possibly \$10. The sales value of copper and its alloys is firmly established for many purposes and the purchasing public looks for the metal as an indication of quality and that value is being received. It is hardly to be supposed, therefore, that a few cents difference in the price of the finished article or commodity will deter a prospective purchaser.

From this look into "copper's book" one can see how the industry has progressed for the last seven years. In 1921 there were large stocks of metal, no production because it was unprofitable, outlets for the metal had been closed because of the use of substitutes, no new markets were in sight and in fact the entire industry was demoralized. In 1928, after seven years of applying the methods and practices previously mentioned, we find that stocks of metal have been reduced to the point where the situation is, if anything, acute; production is 100 per cent of capacity at the end of 1928; many markets that turned to the use of substitutes are now again using copper; many new markets have been developed or are in the process of development. In fact at this time there is no single cloud in sight that would indicate that there was anything but prosperity in store for the copper industry for some time to come. The very agencies which brought about this prosperity will, if kept going, assure its continuance.

Pittsburgh Chapter Formed by Scrap Institute

The sixth chapter of the Institute of Scrap Iron and Steel was organized at a meeting held at the William Penn Hotel, Pittsburgh, Wednesday evening, Nov. 21, at which 55 scrap iron and steel merchants and brokers, representing at least 40 firms engaged in the business in Portsmouth, Steubenville, Canton, Massillon, Cleveland and Youngstown, Ohio, Detroit, Erie, Pittsburgh and Johnstown, Pa., were present. The new section was started with 30 subscribing firms and is to be known as the Pittsburgh chapter, but as one of the primary purposes of the institute is to foster cordial relations among the membership through monthly meetings of the chapters, it was realized at the organization meeting that the enrollment is so widely scattered that frequent meetings were not likely to be feasible. Accordingly, it is probable that additional chapters will be formed out of the Pittsburgh chapter, with the latter to embrace only the members within the Pittsburgh district. Chapters were suggested at Detroit, at Youngstown, to take in members engaged in the business in that city, Canton and Massillon and at Cleveland.

Charles Dreifus, president Charles Dreifus Co., Pittsburgh, was elected president of the Pittsburgh chapter; H. N. Trimble, Pittsburgh, chairman of the executive committee; M. B. Speer, Rotter & Speer Co., Cleveland, first vice-president; Isaac Wilkoff, Wilkoff Co., Youngstown, second vice-president; E. H. Schwartzberg, Cleveland, third vice-president; I. W.

Solomon, Pittsburgh, secretary; Fred Wimmer, Hausman & Wimmer Co., Pittsburgh, treasurer, and H. Tuch, United Iron & Metal Co., Pittsburgh; Jay G. Stephens, Jay G. Stephens Corporation, Pittsburgh; J. E. Jacobson, Luria Brothers Co., Pittsburgh; Hugh Ruffner, Wellsville Iron & Metal Co., Steubenville, Ohio, and Harry Cohn, A. H. Cohn & Co., Butler, Pa., directors.

Benjamin Schwartz, director general of the institute, who presided at the meeting, explained the aims and purposes of the new organization, and pointed out many of the evils that had crept into the business, which called for elimination if the industry is to take its proper place as an important adjunct to the iron, steel and metal industries. He expressed the belief that the scrap industry had not adjusted itself to the hand-to-mouth systems now generally observed in not only the iron and steel business, but in the business world at large. He mentioned a number of problems immediately confronting the trade, emphasizing the tendency toward amalgamation among both producers and consumers of scrap and the growing disposition of consumers to buy scrap direct from producers. An organized effort on the part of the institute to secure more equitable freight rates on scrap; the setting up of a code of business ethics; education of the dealers in the needs of the consumers; clarification of specifications; an arbitration committee to settle disputes between dealers without recourse to the courts and credit service were among the activities Mr. Schwartz believed the new body might properly engage in.

Vertical Casting 16 Ft. High

WATER condenser connection made by Caldwell Foundry & Machine Co., Birmingham, for the Alabama Power Co. It was cast vertically, all metal being poured at one time. It is 16 ft. 2 in. in length and weighs 36,410 lb. Both ends are faced and drilled. The outside measurements are 8 ft. 8¼ in. at the large end and 6 ft. 8 in. at the small end. Inside it measures 7 ft. 4 in. at the large end and 5 ft. 6 in. at the small end.



Business Analysis and Forecast

Business Volume Tends to Taper Off

Downward Movement of P-V Line Indicates Approaching Recession — Too Much Speculation for Health of Industrial Structure

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

WHILE the net balance of the fundamental factors and the more significant indexes is somewhat less favorable than it was a month ago, probably the most notable change is the setback in retail trade. Also, the underlying trend of building permits and contemplated new construction continues to be downward. We are getting used to the higher money rates, but the fact remains that new bond issues are much curtailed; the cost of funds is so high in comparison with yields on invested capital that the result must be a tendency toward restricted investment. If we add to these factors the decline in commodity prices, the drop in farm purchasing power below a year ago and the fearful development of speculation in stocks, it should become obvious that business factors are not all favorable. It is fairly clear that supplies of commodities have on the average gained on the demand.

But these less favorable conditions are still offset by the prevalence of optimistic sentiment and the evidence of expansion in several of the key industries. Thanks to a large volume of public works and utility construction, building contracts ran high in October. The automobile and steel industries show great activity, in spite of a seasonal decline. Merchandise exports made a record in October, and the importation of some \$50,000,000 in gold, along with a decrease in member bank borrowing at the Reserve banks, has eased the credit situation. The outcome of the national election seems to assure stability of political conditions.

The less favorable trend of the P-V line barometer is not expected to be reflected in business developments for at least three or four months.

Thus the outlook for general business indicates a condition that will on the average amount to stability. The

outlook for earnings continues to be fair to good. A satisfactory level of purchasing power exists. Some recovery is indicated among those industries that have been backward during recent years. These conditions should counteract a little recession in some of the more active lines, which seems likely to show up in the November and December figures. The outlook in general is favorable for the remainder of the year and for the first month or two in 1929.

Barometer Says Decline Is Impending

OUR P-V line (a ratio of commodity prices to the physical volume of trade) took a definite downturn in October. The decline was not sharp, but it makes a forecast of some recession in general business within from four to six months from October. The same remark

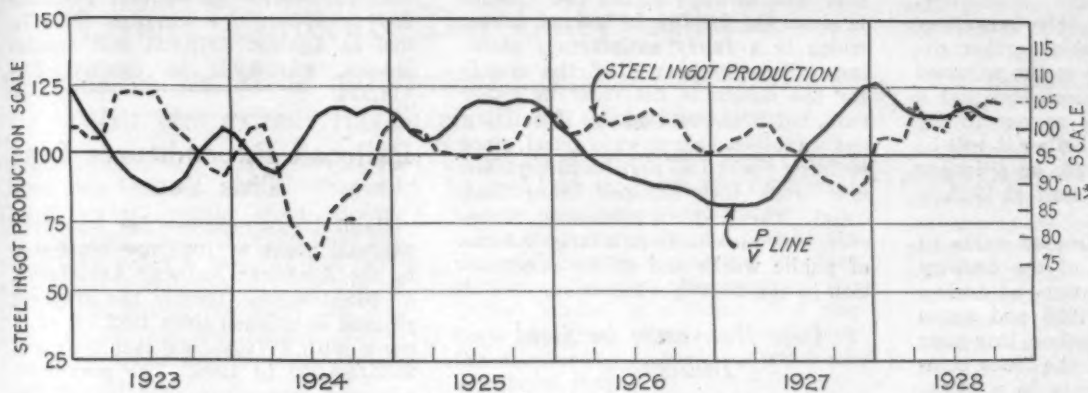
Factors in the General Business Outlook

Favorable Factors

- (1) Construction contracts awarded increased more than usual in October.
- (2) October factory employment made a good gain.
- (3) Railroad freight traffic showed a more than seasonal increase.
- (4) Merchandise exports increased last month and were large.
- (5) Demand for steel and copper is well sustained; unfilled orders of the Steel Corporation increased a little.
- (6) Sizable gold imports have tended to ease credit.
- (7) Republicans win the election.

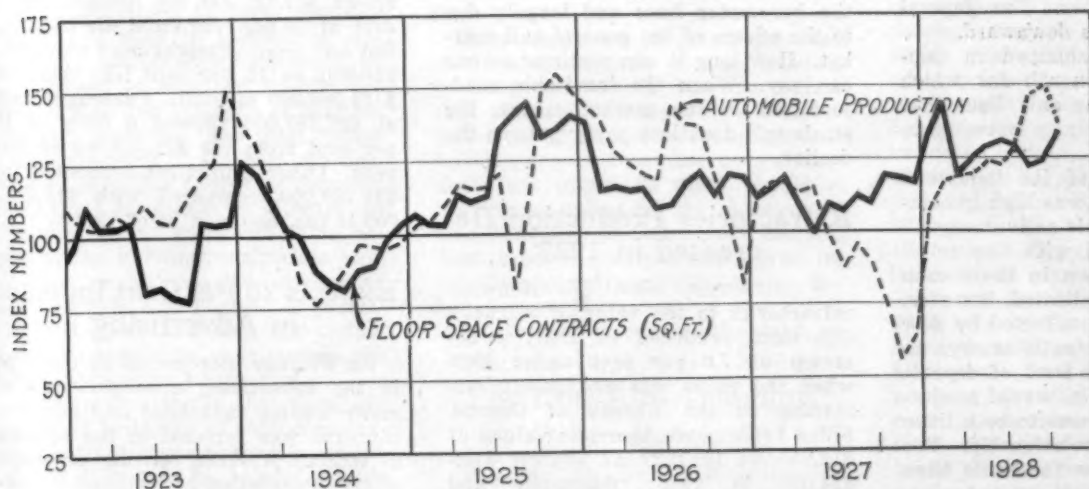
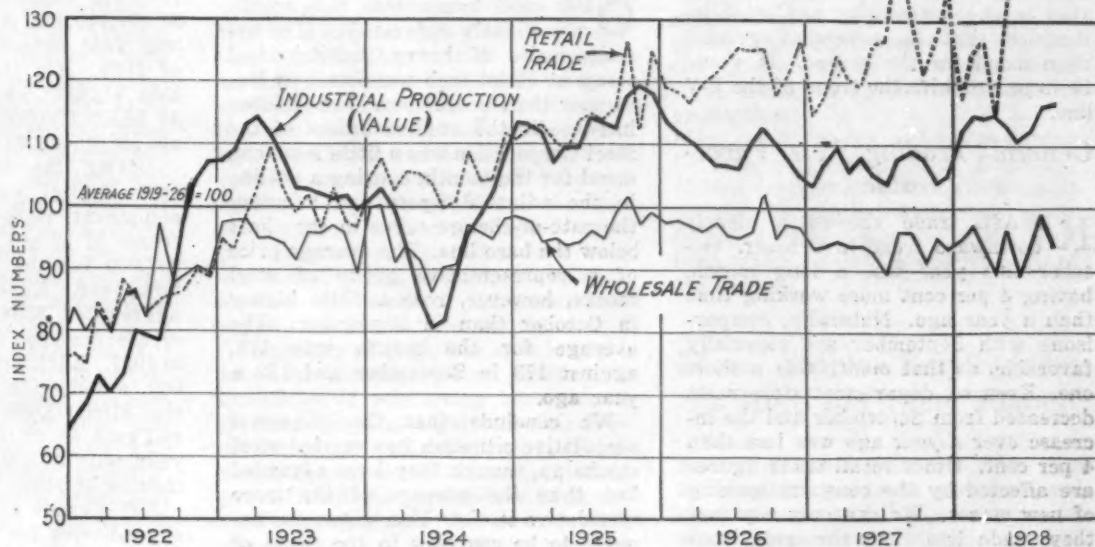
Unfavorable Factors

- (1) The P-V line turns downward.
- (2) Retail trade made a less than seasonal gain; department store sales lower.
- (3) Trend of building plans and permits is downward; bookings of structural steel drop sharply.
- (4) Farm income below a year ago, and purchasing power of the farm dollar lower.
- (5) Speculation is excessive.
- (6) Brokers' loans more and more excessive; banks sell securities and see their deposits decline, as funds flow into speculation.
- (7) Money rates high, restricting security issues.
- (8) October business failures numerous.
- (9) Commodity prices lower; steel scrap declines.



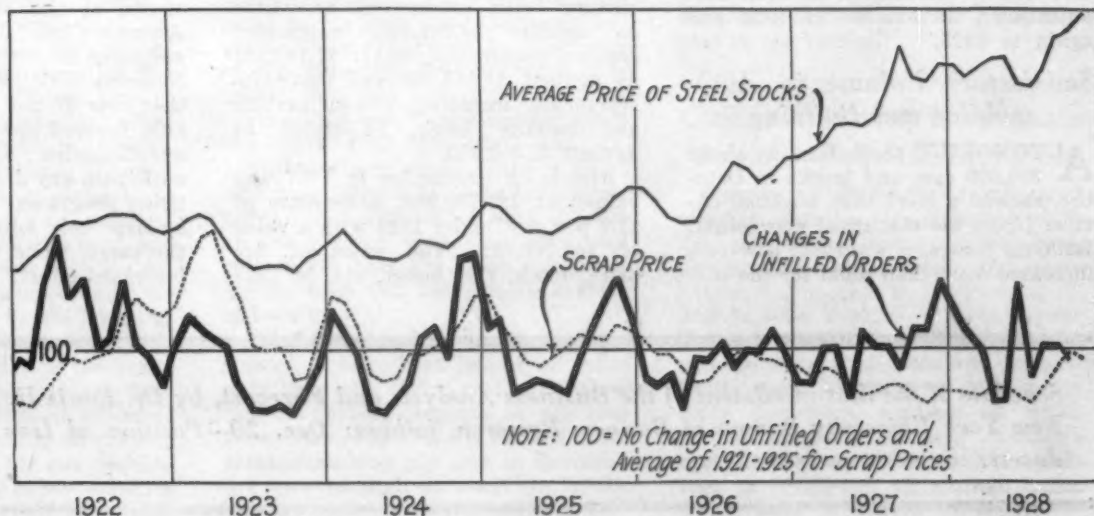
Downward Movement of P-V Line Indicates Approach to a Decline in Business and Industrial Volume. Steel production (adjusted) continues high

Retail Trade Shows a Tendency to Fall Off. Wholesale trade remains slow, while industrial production is progressing at a high level, though somewhat below a normal ratio with final sales



Both Building Activity and Automobile Output Show High Activity. But indications now are that tapering off is to be expected

Unfilled Orders, While Downward, Are Moving Narrowly About the Axis; Stock Prices Are Making New High Records and Scrap Prices Are Again Lower



applies to steel ingot production. Indications based on this barometer are that no considerable further expansion will be shown in the adjusted curve of steel production, and that a moderate setback will appear in the not distant future. Whether it will be a short dip, as in 1926, or a longer decline, as in the first half of 1925, it is yet too early to say.

Apparently the estimated value of the industrial output of the country is rounding off for a year-end decline such as occurred in 1926 and again in 1927. Any such decline this year would be partly due to the lower commodity prices, and partly to a recession in the automobile and steel industries that is somewhat greater than usual for the season. It would be in accord with the trend of the P-V line.

General Trading Less Favorable

RETAIL trade showed a clearly downward trend in October. October this year was a long month, having 4 per cent more working time than a year ago. Naturally, comparisons with September are especially favorable, as that month was a short one. Even so, department store sales decreased from September and the increase over a year ago was less than 4 per cent. Other retail trade figures are affected by the constant opening of new stores. We can only say that they made less than the usual seasonal gain in October. The general trend, therefore, was downward.

Wholesale trade slumped in September, the latest month for which we have figures. The only lines that increased in sales volume were meats and furniture.

While the value of the industrial output in September was high in comparison with wholesale sales, it is still low when compared with the retail trade curve, as shown in the second chart. As already indicated, however, the retail index is so affected by new stores that it is not satisfactory. In comparison with the level of department store sales, the industrial production value curve appears to be a little above the average relationship. The situation is thus less favorable than last month, but there is no such maladjustment as existed in 1923 and again in 1925.

Satisfactory Volume in Automobiles and Building

AUTOMOBILE production, at about 398,000 cars and trucks in October, showed a more than seasonal decline (from the statistical viewpoint). Building contracts awarded, however, increased more than usual for the sea-

son. The average of the two indexes is about on the line of normal trend, which is a fairly satisfactory showing. The significance of the trends for the month is not clear in either case, but it seems doubtful if building has established an upward trend, since building permits and contemplated new work both declined more than usual. The gain in contracts, moreover, was due chiefly to a large volume of public works and utility construction in the New York section.

Less Buoyancy in Steel Indicators

OUR steel barometers this month are slightly unfavorable. The average price of heavy melting steel scrap at Pittsburgh was lower in November than in October. The October increase in the unfilled orders of the Steel Corporation was a little less than usual for the month, causing a decline in the adjusted figure and bringing the rate-of-change curve in the chart below the base line. The average price of a representative group of steel stocks, however, rose a little higher in October than in September. The average for the month was 178, against 173 in September and 152 a year ago.

We conclude that the abnormal speculative situation has carried steel stocks up, though they have advanced less than the average of the more speculative stocks. This movement appears to be contrary to the trend of the barometer lines and largely due to the effects of the general bull market. How long it can continue no one can say. When the inevitable readjustment in the market comes, the steels will doubtless participate in the decline.

Refractories Production Decreased in 1927

WASHINGTON, Nov. 27.—Non-clay refractories to the value of \$22,645,633 were produced in 1927, a decrease of 7.6 per cent under 1926 when the value was \$24,505,519, according to the Bureau of Census. Silica brick production was valued at \$12,756,994 in 1927 as against \$13,614,033 in 1926; magnesite and chrome brick production, \$3,874,176 as against \$4,762,645; refractory cement (magnesite, etc.), \$1,184,121 as against \$1,045,468 and other refractories, including silicon carbide and bauxite brick, \$4,830,342 as against \$5,083,373.

Fire brick production in 1927 was valued at \$37,750,230, a decrease of 11.6 per cent under 1926 with a value of \$42,706,932. The value of fire brick, block, tile, boiler, etc. in 1927

was \$33,866,153 as against \$40,013,394 in 1926; high alumina, \$1,187,096 as against \$978,624 and special shapes, \$2,696,981 as against \$1,714,914.

Railroad Expenditures Less This Year

Capital expenditures for improved railroad plant in 1928 are estimated by the American Railway Association at \$650,000,000. This is the smallest amount so utilized since 1922. It compares with \$771,552,000 last year and \$885,086,000 in 1926. The maximum post-war expenditure was in 1923, at \$1,059,149,000, which is the only post-war year exceeding the expenditures of 1926. For the nine years ending Dec. 31, next, expenditures are placed at \$6,628,296,000, or an annual average of about \$736,000,000.

During the first nine months of 1928, capital expenditures for new equipment were \$165,967,000, a decrease of 19 per cent from the \$204,992,000 for the corresponding period last year. Roadway and structures aggregated \$334,200,000, a reduction of 8½ per cent from the \$365,223,000 in 1927. Additional track cost \$91,241,000, a reduction of 16 per cent from the \$108,002,000 last year. Heavier rail took about the same amount each year, with \$34,891,000 in the first nine months of 1928.

Sub-division of the new equipment expenditures for the first nine months shows \$37,121,000 for locomotives, a drop of 30 per cent from the \$53,721,000 last year. Freight cars cost \$89,920,000, or 13 per cent less than the \$104,565,000 of 1927. Passenger cars at \$27,187,000 showed a drop of 13 per cent from the \$31,383,000 of last year. Other equipment accounted for \$11,739,000, compared with \$15,323,000 in the nine months of 1927.

Expects 20 Per Cent Increase in Advertising

An average increase of 20 per cent in the advertising appropriations of many leading industrial and business concerns was forecast in the address of William A. Hart, retiring president of the Association of National Advertisers, at the annual convention at Atlantic City. Mr. Hart, who is advertising director of E. I. du Pont de Nemours & Co., Wilmington, Del., said that over 50 per cent of the membership favored him with a reply to his questionnaire. Less than 6 per cent anticipate any decrease in their advertising programs. Twenty-nine per cent believe their advertising to be about the same, while 65 per cent forecast increased effort.

Schedule of the next instalment of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: Dec. 20—Position of Iron and Steel Producers.

Lower Concrete Bar Duty Upheld

Refunds to Be Made on Protested Shipments—Decision Will Not Affect Bar-Sized Shape Classification

THE decision of Justice I. F. Fischer of the United States Customs Court, Second Division, given on Jan. 31, this year, that deformed bars are structural material, as such are dutiable under Paragraph 312 instead of Paragraph 304 of the tariff act, has been upheld by the United States Court of Customs Appeals, Justice Graham presiding.

In rendering its decision upholding Justice Fischer, the Court of Appeals points out that corrugated bars have upon their surfaces ridges and protuberances so placed and spaced as to make them suitable for holding when embedded in concrete construction. "The principal use of this material, as shown by the testimony, was for reinforcement for concrete. A minor use of the same is shown by the record for making ornamental grill and other iron work, but it is not contended that this is a major, or even an important, use of the product. It is not used for forging or machine work, because of its deformations. It is also disclosed by the evidence that this material is used in conjunction with concrete in making floors, conduits, bridges, walls and, in fact, practically every structure where concrete is used.

"The testimony further discloses that, where used in a building, the plans and specifications prepared by the engineer or architect specify the location, size and strength of such reinforcing material, and that, when so used, the ends of the bars are usually bent in such a form that they can be anchored by means of stirrups, or otherwise, to the wall columns or laterals of the building, and, after having been so placed, are surrounded with concrete and become a permanent part of the building, and cannot be removed without endangering the stability and strength thereof.

"It is further shown that these are used in all buildings of steel construction, wherever concrete work is needed, and are also used as reinforcements in concrete buildings or structures where no steel framework is used. The bending of the ends for attachment to the other members of the building is done by workmen, usually in the progress of construction; when this material is imported it is straight, without any such finishing. When a structure in which such material is used is completed, the said material assists in carrying both the dead and live loads of the building, has the capacity to resist great tension and compression, contributes to the stability of the structure and becomes an integral part of the skeleton of the same. The imported material has not been assembled, manufactured or advanced beyond hammering, rolling or casting.

"The only question for our decision is whether the court below erred in holding, under this proof, that said

material constitutes 'structural shapes' of steel. We incline to the view there was no error in so holding."

The court then cites the case of the United States vs. Frank and the case of Simon, Buhler & Baumann vs. the United States in deciding that the lower court was correct in considering the reinforcing bars in question as structural shapes.

The court then says: "In conclusion, it is argued that if the deformed bars in issue here are to be treated as structural shapes of steel, then all steel which goes into a structure and becomes a part thereof must be so treated. This does not follow, and this opinion should not be taken as so holding. The classification of such steel will, in each case, depend upon its designation, character and use, whether it ought, properly, to be considered as material or 'structural shapes and forms.'"

Importers of steel, who have brought into the country some substantial quantities of reinforcing bars, on all of which they have paid the full duty of 30c. per 100 lb. specified in Paragraph 304, at the same time entering protest, will be entitled to refunds, as Paragraph 312, the new classification, exacts a duty of 20c. per 100 lb.

It is suggested by importers that the final paragraph of the decision, pointing out that it does not follow that all steel that goes into a structure must be treated as structural material, removes this case as a precedent that might be cited should a hearing be called on the question of classification of bar-sized shapes. That product was recently placed by the Treasury Department under the bar paragraph instead of the structural, thereby increasing the duty.

Pig Iron Anti-Dumping Order Revoked

WASHINGTON, Nov. 27.—Revocation of the anti-dumping order against imports of pig iron from Germany, announced last Thursday by Secretary of the Treasury Mellon, was a formality that had been expected. Imports of pig iron from Germany since the order went into effect Jan. 29, 1927, have been small. During all of 1927 they were 9211 gross tons, while for the 10 months ended with October of the present year they amounted only to 395 tons, the latest movement having been 300 tons which arrived last July.

The anti-dumping penalty is considered to have been less of an influence than the rising cost of production in curbing imports of pig iron from Germany. It is stated that costs of making pig iron in Germany are now as high as they are in the United States, and a prominent Ger-

man producer recently declared that pig iron is produced more cheaply in Alabama district than in Germany.

The anti-dumping order followed protests from Eastern merchant furnace operators against heavy shipments from Germany at prices which it was contended were lower than the German home market levels. Application was made for an anti-dumping order. It was granted. There also was pending an application before the Tariff Commission for a 50 per cent increase in the pig iron duty. This increase was proclaimed by President Coolidge, but it is considered doubtful that this higher duty has had much effect in checking pig iron imports. The duty increase of 37.5c. per ton is declared to have been small when measured again rising costs of production.

In revoking the order concerning German pig iron imports, Secretary Mellon instructed customs officers to maintain a continued scrutiny so as to guard against renewal of the practices which brought about issuance of the order.

More Stable Employment in Iron and Steel Plants

Studies made by the United States Bureau of Labor Statistics show that 32 identical plants in the iron and steel industry have had an average of about 94 per cent full-time employment from the beginning of 1926 through August, 1928. For the calendar year 1926 this was 94.3 per cent; it was 93.6 per cent in 1927, and for the first eight months of this year has been 94.2 per cent. The 32 plants reporting employ, collectively, about 40 per cent of all the workers in the industry. These figures compare with 91.2 per cent in 1925; 88.3 per cent in 1924, and 88.9 per cent in 1923—the latter for 30 companies only.

During the first eight months of 1928 two of the companies showed more than 98 per cent full-time employment. Two others were over 97 per cent, and 10 more exceeded 96 per cent. Less than 10 per cent of the total in the past three years has been below 90 per cent. Consistent improvement has been shown by many of the plants since the earlier years covered in the survey.

Oakite Products, Inc., Holds Annual Sales Conference

Completing 20 years of industrial cleaning service, the technical staff, field service men and executives comprising the organization of Oakite Products, Inc., met in the general offices in New York, Nov. 14 to 17, for their annual sales conference. District managers and representatives from 33 States and Canada came together in daily discussion, subjects of which ranged from the cleaning of watch crystals to ocean liners and silk stockings to 80,000-bbl. oil storage tanks. There were 19 papers discussed.

Automotive Meeting Well Attended

Production Executives Discuss Costs, Materials Handling, Time Study and Other Shop Problems

HELD at the center of automobile manufacturing activity and offering a program of high caliber, the annual production meeting of the Society of Automotive Engineers, at the Book-Cadillac Hotel, Detroit, Nov. 22 and 23, attracted an unusually large attendance. Twelve papers and six committee reports were presented at the five technical sessions and the production dinner featured an address by K. T. Keller, vice-president in charge of manufacturing, Chrysler Corporation, Detroit.

First of the technical papers read was, "How the Ford Motor Co. Gets Its Low Production Costs," by John Younger, professor of industrial engineering at Ohio State University. He began by citing the 15 basic laws of manufacturing management as codified by L. P. Alford, in 1926, and claimed that the Ford company has been using them for years. The rest of his paper outlined methods in various Ford plants, and spirited discussion followed Mr. Younger's presentation.

The second paper of the morning session was by L. A. Baron, "Accounting for Depreciation as a Production Cost." Mr. Baron, who is Comptroller of the Stutz Motor Car Co., began by quoting a statement made by the Chamber of Commerce of the United States, to the effect that the business man who does not charge depreciation at all is fooling himself. This paper was well received and also provoked active discussion.

An outstanding paper of the afternoon session was "Integral-Contact Gearing," by A. B. Cox, consulting engineer, Wilkinsburg, Pa. The paper dealt with problems of gear-tooth breakage, wear and noise. Integral-contact gearing, it was held, is the solution of most of the baffling problems of gear-tooth fatigue and breakage, wear and pitting and vibration and noise. Mr. Cox illustrated his paper with a large number of stereopticon slides, showing tooth contact in stub-tooth and other types of gears.

The production dinner held under the auspices of the Detroit section of the S. A. E. in the main ballroom of the Book-Cadillac Hotel, was attended by 670 members and guests. This number so far exceeded the provisions made for the dinner that tables had to be laid on the balconies and even out in the foyer of the ball room. At the speakers' table were E. P. Blanchard, Bullard Machine Tool Co., Bridgeport, Conn.; B. J. Lemon, United States Rubber Co., chairman of the Detroit section; G. W. Wall, consulting engineer, Indianapolis, president of the S. A. E.; W. R. Strickland, of the Cadillac Motor Car Co., president-elect of the S. A. E.; Coker F. Clarkson, general manager of the S. A. E.; J. M. Crawford of the

Chevrolet Motor Co., chairman of the meetings committee of the Detroit section; E. P. Warner, Assistant Secretary of the Navy for Aeronautics; F. E. Moskovics, president of the Stutz Motor Car Co. of America; S. P. Thacher, second vice-president of the United States Rubber Co.; K. T. Keller, vice-president in charge of manufacturing, Chrysler Corporation; H. M. Crane, chairman of the technical committee, General Motors Corporation; L. Clayton Hill, Murray Corporation of America; V. P. Rumely, Hudson Motor Car Co.; J. H. Hunt, Chevrolet Motor Co., past-president of the S. A. E., and L. L. Roberts, Packard Motor Car Co.

A number of those at the speakers' table made short speeches. In his address on "Production—Men, Methods and Machines," K. T. Keller, speaker of the evening, pointed out that in the rapid development of the automobile industry a new type of engineer has been developed who is as much an integral part of the industry as the mechanical engineers who design the cars. He predicted that production engineers would soon be fully as important and numerous as the mechanical engineers.

Session Devoted to Materials Handling

In addition to three papers, the comprehensive report of the materials handling subcommittee provided much interesting data at the opening session, Nov. 23. New conditions in the transportation, storing and fabrication of materials in the automotive industry were outlined in the report of the subcommittee, which is headed by V. P. Rumely, Hudson Motor Car Co., Detroit.

"Today the universal desire to operate with a minimum inventory in all plants creates a greater need for more rapid movement of stock," states the report. "This requires more mobile equipment than heretofore. Larger production schedules involve greater volume of materials, which in turn justify larger and faster units for handling. It is not uncommon today to find a plant manager operating the factory with few if any stockrooms. Materials are taken from freight cars and trucks in suitable containers directly to the manufacturing department and placed into production with no rehandling."

Some of the important developments in material handling equipment and methods, including the handling of sheet steel, are outlined in the committee's report. The papers at this session were: "Assembly Plant Layout for Material Handling," by N. H. Preble, Mechanical Handling Systems, Inc.; "Selection of Conveyor Power Units," by C. E. Broome, Gears & Forgings, Inc.; and "Possibilities and

Limitations of Conveyor-Chain Curvature," by J. B. Webb, J. B. Webb Co.

"Power Transmission Engineering as Affecting Production and Cost," by W. W. Nichols, D. P. Brown & Co., was an outstanding contribution to the power transmission session, which followed the materials handling meeting.

Outlines Characteristics of Carboloy Tool Material

The last session of the meeting, under the chairmanship of Guy Hubbard, National-Acme Co., Cleveland, had a generous program. In addition to a paper on the "Interpretation of Production Records," by Paul Geyser, General Motors Truck Co., and another on "The Relation of Time Study to Manufacturing," by L. W. Haskell, Dodge Brothers, Inc., G. N. Sieger, sales manager, Carboloy Co., 350 Madison Avenue, New York, spoke briefly on the "Development and Uses of Carboloy."

The full possibilities of this new tungsten carbide tool material, described in THE IRON AGE of Oct. 18, were said to be as yet unknown.

"Carboloy has outstanding characteristics," said Mr. Sieger. "It is extremely hard but its outstanding weakness is that it is not very tough. It will scratch a sapphire, yet it is not a complete substitute for the diamond. It is being used successfully in drawing dies, and even in diamond tools. The turning of Hatfield manganese steel, until now practically unmachinable, yields readily to Carboloy."

Elkonite, advertised as unmachinable and only to be finished by grinding, was said to be turned at a rate of 130 ft. a minute by Carboloy tools. Mr. Sieger gave figures on a number of jobs where Carboloy had been remarkably successful, including its use in machining aluminum bronze. He said that his company does not believe that Carboloy is going to revolutionize the industry or even replace any of the popular cutting steels of today, but that they believe it has a definite place in production methods.

In the discussion following Mr. Sieger's paper, C. R. Burt, general manager of Pratt & Whitney Co., Hartford, Conn., spoke briefly on the new Widia alloy, another tungsten carbide material, developed by the Krupp Steel Works, Essen, Germany, and described in THE IRON AGE of Sept. 27. Speaking of a demonstration he had witnessed in Germany, Mr. Burt said: "In one instance there was a test made on a bar of 8-in. steel, making a cut of about 1/2-in. in depth with a fine feed, which is necessary, I am informed, in using that alloy, the feed being about 0.020 in. The first demonstration was at a speed of about 300 ft. a min., and it was not a short cut. Two points surprised me; one was: after taking this high-speed cut there was practically no heat in the steel. The heat seemed to have been carried away with the chips, and it was also surprising to

note the very fine finish that it left, partly due, I suppose, to the fine feed.

"I brought back from Germany about 15 or 18 of the Widia alloy tools for experimental purposes. Some of them were finished tools and others were tips which we intend to braze on. We ran into some difficulties simply because we did not understand how to use them. The way the tool is ground is very important. After the grinding operation it is also advisable to give the tool a high finish by buffing. The higher the finish, the better durability you get from the cutting tool.

"I understand that several factories have increased their production 4 to 1 with these tools. They also found the tools would last, in many cases, for one week between grindings, while previously it was frequently necessary that the same tools be ground every day."

"The Widia tools are similar to the Carboloy in that they are extremely brittle," said Mr. Burt in another

part. "They have to be handled with care, and the grinding of the tools, I believe, is one of the most important factors in getting good results. The different shapes have a great deal to do with it. I think, from what I learned over there, one would not always use the same shape that we now use with high-speed steel. It is necessary to reduce the cut materially. It is a mistake to try to put this alloy in with a heavy cut and a heavy feed. You simply will not get the result."

Mr. Burt spoke of a test of this material he had witnessed in England on a high-speed planer, a new machine which was being demonstrated at the Olympia Show. "It was quite a revelation to me for speed," he said. "The table of the planer was traveling on the cutting side at a speed of 280 ft. a minute, with a cut $\frac{1}{4}$ in. deep and about $\frac{1}{60}$ in. wide. As the table traveled 280 ft. a minute peeling off the cast iron chips, it gave one the impression that the machine was merely cutting wood."

Warns Against Mania for Mergers

Consolidations Have Disadvantages That May More Than Offset Economies Effectuated

WARNING against the "mania for mergers" was sounded recently by James O. McKinsey, professor of business administration of the University of Chicago, in an address before the Illinois Manufacturers' Costs Association at Chicago.

"The investment bankers," he said, "who largely work out these mergers, may not be particularly interested in your own particular problems. I have a record of 35 mergers each of not less than five companies whose promoters predicted a 45 per cent increase in profits within five years. As a matter of fact, the profits over a 10-year period have been 18 per cent less than they would have been had the companies operated independently."

Some of the disadvantages of mergers as pointed out by Professor McKinsey were:

"While large organizations may have their advantages, especially in banking mergers, some of the customers may feel that they do not receive so distinctive a service. The tendency in large organizations is toward routine and standardization, and lack of flexibility. They cannot make exceptions in policy to meet the needs of a customer.

"One way to overcome this is to maintain the intimate personal contact with old customers by retaining as many as possible of the old executive staffs. This, however, does not decrease the overhead. Frequently, in the case of mergers of companies with competing products, each with a valuable trademark, the company will lose

business in trying to win customers over to one of the two products.

"A company that acquires other manufacturing companies making supplementary products in a measure finds that it loses the business that it formerly enjoyed as a result of concentrating on some specific product. I have in mind a commercial textbook company which undertook to produce every other type of book used in a high school. It was a mistake—an overburdened salesman trying to handle a large variety of products will not do so well as one who specializes in a single product.

"The usual accompaniment of a merger is to undertake the reduction of an over-supply of executives and employees. It is an advantage to eliminate deadwood. It is difficult to secure executives to handle all the larger problems of an expanded business resulting from a merger. A president or sales manager who is doing a business of \$5,000,000 a year frequently cannot efficiently handle a \$25,000,000 a year business although he may grow to it in time if he possesses the necessary intelligence and force.

"In the case of a merger there is frequently jealousy between the former and the more recent group of employees, and it takes diplomacy and care to bring about effective cooperation. Old employees find it difficult to fit into the new picture, especially when they lose contact with the president and other high officials and report to lesser officials. They lose the desire to display initiative, feeling they are part of a chain."

United States Consumes Half of World's Tin

Consumption of tin in the United States is so large that the annual imports amount to about one-half of the world's production of that metal, according to the United States Bureau of Mines. As the result of a canvass made to ascertain the amount of tin consumed for different purposes in the United States during 1927, the bureau found that 24,527 gross tons of primary or virgin tin was used in the manufacture of tin andterne plate, accounting for 35.65 per cent of the total consumption of primary tin in the United States in that year. Next in order of magnitude as a consuming factor is solder, which required 13,734 tons, or 19.96 per cent of the total. The manufacture of babbitt required 8705 tons, and foil and collapsible tubes consumed 6903 tons. The results of the bureau's inquiry, wherein effort was made to eliminate figures relating to secondary tin, account for 68,797 tons of primary tin, a quantity equivalent to 96.7 per cent of the imports in 1927. The results of this canvass, based on reports from 1050 companies, are tabulated in Information Circular 6084, "Consumption of Primary or Virgin Tin in the United States," by J. B. Umhau, copies of which may be obtained from the bureau.

British Metallurgist to Lecture Here

Ulick R. Evans, Cambridge University, Cambridge, England, will deliver the annual lecture of the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers during the annual meeting of the institute in New York, the week of Feb. 18, 1929. His lecture will be on "Corrosion," and he will preside at a symposium on this subject.

Following the annual lecture Mr. Evans will deliver groups of lectures at New Haven, Conn., Cambridge, Mass., Cleveland, Pittsburgh and Washington, with single lectures at various other points.

Cleveland Engineers Visit Rubber Plants

The Cleveland Engineering Society made an inspection trip to Akron, Ohio, Nov. 27, visiting the plants of the Goodyear Tire & Rubber Co. and the B. F. Goodrich Co. In the evening a joint meeting with the Akron section of the American Society of Mechanical Engineers, the Akron section of the American Institute of Electrical Engineers and the Rubber division of the American Chemical Society, was held at the Akron City Club. An illustrated talk on dirigibles was given by Dr. Carl Arnstein, vice-president and chief engineer of the Goodyear Zeppelin Co., and H. H. Timlin told of the Firestone Tire & Rubber Co.'s rubber plantation in Liberia, Africa.

Fabricated Structural Steel

Bridge at New York Takes 26,500 Tons—Awards Total 58,600 and New Projects Call for 25,100 Tons

WITH a bridge at New York to connect Staten Island and New Jersey requiring 26,500 tons and another across the Ohio River at Madison, Ind., 5200 tons, fabricated structural steel awards reported during the week amounted to 58,600 tons. New projects, calling for 25,100 tons, included a Chicago club, which will take 6000 tons. Awards follow:

BOSTON, 1100 tons, Boston & Maine Railroad hotel, to New England Structural Co.

BOSTON & MAINE RAILROAD, 1100 tons, nine bridges, to Boston Bridge Works, Inc.

BOSTON & MAINE RAILROAD, 193 tons, three bridges, to Bethlehem Bridge Co. NEWTON, MASS., 115 tons, high school, to Boston Structural Steel Co.

PROVIDENCE, R. I., 340 tons, Providence Institute of Savings, to J. H. Tower Iron Works.

NEW YORK, 26,500 tons, bridge over Kill van Kull connecting Staten Island and New Jersey, to American Bridge Co.

NEW YORK, 2500 tons, shoring steel for subway construction for Clemente Contracting Co., Inc., to American Bridge Co.

NEW YORK, 1100 tons, apartment building on East Eighty-sixth Street, to Hedden Iron Construction Co.

NEW YORK, 1000 tons, apartment building at 623 Park Avenue, from Starrett Brothers, general contractors, to Hedden Iron Construction Co.

NEW YORK, 900 tons, public school No. 96, to Harris Structural Steel Co.

NEW YORK, 800 tons, apartment hotel on East Eighty-third Street, to Easton Structural Steel Co.

DELAWARE, LACKAWANNA & WESTERN RAILROAD, 700 tons, four bridges at Jersey City, to American Bridge Co.

DELAWARE & HUDSON RAILROAD, 175 tons, bridge at Lanesboro, Pa., to American Bridge Co.

WERNERSVILLE, PA., 560 tons, building for Jesuit Novitiate, to Robinson Iron & Steel Co.

EASTON, PA., 300 tons, Lafayette College engineering hall, to McClintic-Marshall Co.

NEW MILFORD, N. J., 150 tons, building for Austin Co., to Montgomery Iron & Steel Co.

PENNS GROVE, N. J., 180 tons steel piling, for American Gas & Electric Co. plant, to Bethlehem Steel Co.

EAST LIBERTY, PA., 100 tons, additional shelter shed for Pennsylvania Railroad, to Guilbert Steel Co.

HARRISBURG, PA., 337 tons, Zembo Shriners temple, to Jones & Laughlin Steel Corporation.

PITTSBURGH, 160 tons, coal cleaner building, Hillman Coal & Coke Co., to Jones & Laughlin Steel Corporation.

FORT HURON, MICH., 285 tons, exchange building for Michigan Bell Telephone Co., to Whitehead & Kales Co.

FLINT, MICH., 125 tons, high school, to Guilbert Steel Co.

CLEVELAND, 3000 tons, Cleveland Union Terminal Co., catenary bridges and other steel work required for electrification of railroads entering Cleveland Union Depot, to Fort Pitt Bridge Works.

MADISON, IND., 5200 tons, bridge over Ohio River for J. G. White Engineering Corporation, to Mount Vernon Bridge Co.

INDIANA & MICHIGAN RAILROAD, 1000 tons, highway bridges, to Indiana Bridge Co.

LOUISVILLE & NASHVILLE RAILROAD, 1300

tons, bridges, to American Bridge Co.

NORTHERN PACIFIC RAILROAD, 1150 tons, to American Bridge Co., Minneapolis Steel & Machinery Co. and St. Paul Foundry Co.

ROCK ISLAND RAILROAD, 200 tons, bridges, to American Bridge Co.

CHICAGO, 400 tons, social science building for University of Chicago, to Wend-nagel & Co.

OLYMPIA, WASH., 230 tons, Kalama River bridge, to unnamed interest.

SACRAMENTO, CAL., 150 tons, Bank of Italy, to Palm Iron Works.

PORTLAND, ORE., 243 tons, Gardiner bridge on Yellowstone-Trall Highway, to unnamed interest.

SAN FRANCISCO, 900 tons, plates, three 82,000-bbl. tanks for Shell Oil Co., to Steel Tank & Pipe Co.

SAN FRANCISCO, 900 tons, plates, three 82,000-bbl. tanks for Shell Oil Co., to Western Pipe & Steel Co.

SAN FRANCISCO, 1500 tons, bridge work for Southern Pacific Co., to American Bridge Co.

SAN FRANCISCO, 300 tons, two apartment buildings, Broadway and Octavia Street, to Golden Gate Iron Works.

LONGVIEW, WASH., 425 tons, saw mill for Weyerhaeuser Lumber Co., to Star Iron & Steel Works.

ALHAMBRA, CAL., 100 tons, factory for Kay Steel Co., to Union Iron Works.

LOS ANGELES, 180 tons, Stauffer Chemical plant, to Union Iron Works.

LOS ANGELES, 1600 tons, apartment building, Wilshire Boulevard and Commonwealth Street, to Union Iron Works.

LOS ANGELES, 381 tons, three buildings for Paramount Film Corporation, to Union Iron Works.

LOS ANGELES, 344 tons, office building on South Spring Street, to Llewellyn Iron Works.

SANTA MONICA, CAL., 113 tons, apartment building, Second Street, to Baker Iron Works.

HONOLULU, 250 tons, steel barge for Young Brothers, Ltd., to Wallace Bridge & Structural Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

PROVIDENCE, R. I., 200 tons, New England Steamship Co. freight shed.

BOSTON, 1100 tons, three-story addition to North Station for Boston & Maine Railroad.

BOSTON & MAINE RAILROAD, 1000 tons, 12 bridges.

BALTIMORE & OHIO RAILROAD, 200 tons, bridge on Staten Island, N. Y.

MASSENA, N. Y., 2000 tons, manufacturing building for Aluminum Co. of America.

SYRACUSE, N. Y., 150 tons, Psychiatric Hospital.

STATE OF NEW JERSEY, 1240 tons, highway bridges; 1100 tons for Ridgefield Park and 140 tons for Metuchen.

VENTNOR CITY, N. J., unstated tonnage, public school building.

CAMDEN, N. J., unnamed tonnage, Woodrow Wilson Junior High School.

ORWIGSBURG, PA., unstated tonnage, building for St. Francis Orphan Asylum.

STATE COLLEGE, PA., unstated tonnage, first unit of Botany Building for Pennsylvania State College.

HOLMESBURG, PA., unstated tonnage, building for Northeast National Bank.

HERSHEY, PA., 2000 tons, community building.

UPPER DARBY, PA., 1100 tons, school building; McClintic-Marshall Co., low bidder.

STATE OF ALABAMA, tonnage not stated, highway bridges.

CLEVELAND, 600 tons, addition to Moreland Courts Apartments.

CLEVELAND, tonnage unstated, plant for Geometric Stamping Co.

CHICAGO, 1000 tons, addition to Washington Park race track pavilion; Chicago Heights Construction Co., general contractor.

CHICAGO, 200 tons, sales building for Studebaker Corporation.

CHICAGO, 6000 tons, La Salle Club.

CHICAGO, 1000 tons, First Regiment Armory, revised.

CHICAGO, 5000 tons, Fine Arts Building, revised.

SUPERIOR, WIS., 700 tons, coal bridge.

ST. LOUIS, 1500 tons, Continental Life Insurance Co. building.

SACRAMENTO, CAL., 170 tons, bridge over Southern Pacific tracks near Benham; Paul N. White, Santa Monica, low bidder.

Gain in October British Steel and Iron Output

LONDON, ENGLAND, Nov. 21 (*By Cable*).—October pig iron output was 543,600 gross tons and the production of steel ingots and castings was 756,000 tons.

A comparison of the October output with that of the nine preceding months of the year, and with the monthly rate for previous years is as follows, in gross tons:

	Pig Iron, Tons	Steel Ingots and Castings, Tons
1913—Av. monthly...	855,000	638,600
1920—Av. monthly...	669,500	755,600
1922—Av. monthly...	408,500	490,100
1923—Av. monthly...	620,000	706,800
1924—Av. monthly...	609,900	685,100
1925—Av. monthly...	519,700	616,400
1926—Av. monthly...	203,500	296,700
1927—Av. monthly...	607,800	758,200
1928—January	560,600	626,200
1928—February	550,800	764,400
1928—March	592,600	793,300
1928—April	555,000	644,100
1928—May	591,500	752,700
1928—June	563,700	709,500
1928—July	537,800	666,900
1928—August	519,000	648,300
1928—September	503,900	718,600
1928—October	543,600	756,000

Large Coal Production

Production of bituminous coal in the week ended Nov. 17 is reported by the United States Bureau of Mines at 10,918,000 net tons. This is slightly above the average of the two preceding weeks and is nearly 1,000,000 tons above the output of the corresponding week of last year. For the elapsed portion of the calendar year, however, production was lower than in 1927, the total through Nov. 17 being reported at 429,971,000 this year, compared with 462,490,000 tons last year. Except for 1924, when the output was nearly 3 per cent lower than this year, 1928 shows the smallest total since 1922, when there was a coal strike.

This Issue in Brief

Dwellings made of "metal lumber" permit the same architectural flexibility as wood. Metal members have holes at 2-in. intervals. No cutting or riveting is required at the job. Armed only with wrenches, mechanics unfamiliar with the work erect the framing with no difficulty.—Page 1347.

* * *

Avoids straight-line production flow to gain flexibility. Equipment in new automatic seamless pipe mills is staggered, with short transfer tables between machines.—Page 1353.

* * *

Approaching business recession indicated by downward movement of P-V Line. However, the less favorable trend is not expected to be reflected in business developments for at least three or four months, says Dr. Haney.—Page 1376.

* * *

Prosperity of "luxury" industries has been achieved in part at the expense of basic industries, says economist. While prices of basic goods have remained low, the goods and services which have been elaborated out of them have tended to remain high in price.—Page 1350.

* * *

"Happy plant atmosphere" and low costs go hand in hand. Establishment of definite rules of conduct for employees and enforcement of such rules have been found to make for contentment among workers and to have produced remarkable savings.—Page 1364.

* * *

Open-hearth furnaces with inadequate regenerative capacity should be operated on short reversal periods, says open-hearth man. Longer periods can be taken when there is ample checker brick to absorb the heat.—Page 1367.

Higher prices for copper will not necessarily lessen demand, copper man believes. "Sales value of copper . . . is firmly established for many purposes and the purchasing public looks for the metal as an indication of quality." A new consumption record will likely be set in 1928.—Page 1374.

* * *

Appreciable reductions in foundry costs can be made by comparing results. Each superintendent thinks his own costs are lowest obtainable, but, if foundries combine into a cost group, items which are higher than the average will be revealed, and an investigation started to determine the reason.—Page 1363.

* * *

Can Federal Trade Commission enforce rules against violators of trade practice agreements? "Still doubtful," says Commission official. It is still more doubtful how minority members of an industry who refuse to subscribe to agreements can be punished.—Page 1374.

* * *

Exports of iron and steel for first 10 months of 1928 are 12 per cent above same period of 1927, while imports are slightly less. October exports were 50 per cent above last year, and the fourth highest month of the past seven years.—Page 1411.

* * *

Money can be saved for big producers of borings by melting the borings in an electric furnace and turning them into high-grade castings. Borings have low market value and the producer can utilize them most advantageously himself, says foundry engineer.—Page 1359.

If consumption were as generously financed as production is, business would be better, economist states. The belief that production automatically finances consumption is a fallacy. Credit fails to perform its full function when it is confined largely to financing production.—Page 1351.

* * *

Better seamless pipe is made by using two piercers instead of one, pipe maker believes. In all but the smaller sizes of pipe, a primary piercer is used first, to pierce a small hole. This is expanded by passing the piece through the second piercer.—Page 1356.

* * *

No possible way of sustaining capital equities created out of production credit expansion, without a corresponding expansion of consumer purchasing power, says economist. Wages may have to undergo a further inflation, without a rise in commodity prices, to bring this about.—Page 1352.

* * *

Stabilizes foundry business by adopting cost group plan. Ridiculous variations in bids have been eliminated by standardized cost system. Guesswork has been avoided and competition has been put on a fair, sound basis.—Page 1363.

* * *

Regulation of competition is dangerous and fallacious, says National Industrial Conference Board economist. Restriction of production involves a restriction of consumer purchasing power, and protected returns to capital invite over-investment and increased competition.—Page 1351.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

The Next Forward Move in Steel

AS a cross-section of the cooperative effort that is now the uppermost thing in American industry, a single recent issue of THE IRON AGE—that of Nov. 15—was an arresting exhibit. The issue was not planned to center on that subject, but events in the great field covered by this journal conspired to make group action by manufacturers the feature of the week.

A leading place was given to a report of the early proceedings of the Biloxi meeting of the American Institute of Steel Construction, whose executive director, Charles F. Abbott, has done a man's job in propagating a more enlightened selling practice in steel fabrication. Able as were other papers on the Biloxi list, the one which the steel industry most needs just now to digest for its health's sake was given by Charles H. Macdonald, recently head of the market research department of the Colorado Fuel & Iron Co., and now its director of sales. (In passing, we predict that five years hence managers of market research departments will rank higher in the lists of steel company executives than they do today—and they will be much more numerous.) It is not because his preachment is one that THE IRON AGE has long urged upon the industry that we specially cite Mr. Macdonald's paper, but because, with all their well-recognized triumphs, the manufacturers of steel now need most of all to move together to get for their products a larger place in popular thought and in every-day life. With no attempt to recapitulate the address, which we have already printed in full, we repeat three or four of its suggestions for better marketing through group action, such as the cement, lumber, brick and other industries have taken with good success:

The public should be educated, through a well planned national campaign of publicity, to the value of steel and its greater use in all requirements large and small.

More effort and money should be devoted to neglected markets for the established and logical use of steel.

A fund should be created for the development of new uses of steel.

We should be in position to offer through an organized bureau, to any industry using or contemplating the use of steel, all the facilities of the entire steel industry for the more rapid and satisfactory development of any practical new product, instead of leaving the customer or some individual steel manufacturer to work out, at an undue expenditure of time and money, products which ultimately bring business to the entire industry.

More attention and study should be given to the problems of individual fabricators and users of structural steel and steel products of every kind.

Also at the Biloxi meeting President W. M. Wood of the institute viewed the situation much as Mr. Macdonald saw it, saying that "in the vital problems of sales and distribution and publicity the industry as a

whole has seemed to be where it was a generation ago, and until recently this fact seems to have been no cause for concern." And F. H. Frankland, who is in charge of the technical service of the institute, declared that the public has not been "sold" on steel, and that it is essential that a "steel consciousness" be inculcated in the minds of the architect, the engineer and the builder through a comprehensive national advertising campaign.

On another page of the Nov. 15 issue the reader learns that 36 representatives of associations in the machinery and equipment industries met at Washington and planned for a series of conferences which will work for the abolition of unfair trade practices. In an adjoining column, E. W. McCullough of the department of manufacture, Chamber of Commerce of the United States, is reported as telling a meeting of manufacturers how by group action whole industries are competing with each other for the supplying of the same demand through different media. On the following page it is told that by cooperating in simplification manufacturers of eaves trough and conductor pipe are now making 94 per cent of the country's output in conformity with the simplified schedule; and the next column reports recent progress in the standardization of small tools and machine tool elements by a committee of the National Machine Tool Builders' Association and two engineering societies.

As a final citation, there is an extended extract from the address of Charles M. Schwab at the "Pioneers of American Industry" dinner in New York, in which he emphasized organization and cooperation as forces in industry, referred to the organization of research on a great scale by manufacturers, and predicted that future pioneering would be by great groups of trained men using each other's scientific knowledge, rather than by individuals as heretofore.

The steel industry is no stranger to cooperation. Judge Gary made the word almost synonymous with his own name. But cooperation in finding new outlets for its products and developing the old, in putting steel in a larger and more rapidly growing place in our twentieth century economy—that is the work to which steel manufacturers are now called by what is happening both in their own industry and in those whose progress depends on its enterprise and vision.

Automobile Prosperity

IT is true that the steel industry is prosperous, but the automobile industry is more so. Comparisons of earnings are frequently made, unfavorable to the former. The difference in conditions is not to be found in the increase in demand or in the demand relative to productive capacity.

As to production, both steel and automobiles made new high records in 1926, then having an off period in 1927. This year the gains over 1926 are not very dissimilar. Production of passenger cars and trucks in the United States and Canada in ten months totaled 4,090,197, of which October accounted for 417,354. A careful estimate allowing for rising Ford production, the present lull in Chevrolet production and seasonal influence with other makers puts the total for 1928 at about 4,800,000, which is $6\frac{1}{2}$ per cent over 1926 and, incidentally, 34 per cent over 1927. This year's steel production gains over 1926 by about 6 per cent, which is much the same thing. No little of the steel industry's prosperity has been due to its automotive trade customer, as the demand came with quite a rush and, cars being made decidedly heavier than in 1926, it called for a substantial gain in tonnage. As we have recently noted, the proportion of the year's steel going into automobile and truck manufacture may easily be 17 per cent, against $14\frac{1}{2}$ per cent in 1926 as shown by THE IRON AGE finding at the end of the year.

On account of Ford being largely out of production in this year, taken as a whole, comparison between production and capacity for 1928 cannot fairly be made. Capacity for 1929 may be put at 7,000,000 cars and trucks, United States and Canada. This figure seems to be reasonably low, based on Ford and Chevrolet estimates and consideration of what other builders did in August, the record high month. A prediction has been made of 6,000,000 production in 1929, which seems altogether rosy, and 5,000,000 is not by any means guaranteed. The latter total would be only a trifle over 70 per cent of capacity, whereas this year's steel production is about 84 per cent of capacity. Thus the comparison of earnings with the ratio of production to capacity makes a curious showing. If it be said that automobiles are more seasonable than steel and thus cannot show as high a percentage of production to annual capacity, it may be rejoined that steel producers have been less resigned to taking their off seasons as they come than the automobile producers have been.

One cannot doubt, however, that the automotive industry is going to have some interesting developments next year as to some producers thriving more than others. A light production works havoc with the individual producer's costs, and the annual turnover relative to assets is so large that price reductions sufficient to turn a poor seller into a good seller are scarcely conceivable.

The combined automobile production of last year and this is about 6 per cent below the combined production of 1925 and 1926, which were both good years. It is on that ground, presumably, that statements have been made that 1929 will be entered with a sort of "deficit" of nearly a million cars. The iron and steel trade had too much experience years ago with computations of alleged deficits in pig iron production to count upon any so-called "deficit" being made up unless conditions are favorable, and when they are sufficiently favorable people will buy even if there is no deficit. If the peak of domestic demand was temporarily passed a couple of years ago, as is quite possible, the growth of exports so frequently mentioned can hardly come in soon enough to bring about substantial increase in total production, for car and truck exports were 305,420 in 1926 and 384,199 in 1927, while 500,000 is an outside

estimate for this year. Increments in future at a greater rate would be remarkable.

Coal Stays in Poor Shape

SUBSTANTIALLY the same stocks of bituminous coal were in consumers' hands Oct. 1 as July 1—the Bureau of Mines reports 41,100,000 tons against 41,700,000 tons. It is normal for stocks to increase during that three-month period. There were reports of coal stocks on these two dates in 1923 and 1926, showing increases of 14,000,000 tons and 4,000,000 tons respectively. One might be disposed to interpret the failure of consumers to accumulate stocks this year as an indication that coal trade conditions will improve. But coal buyers watch the coal situation very closely and their failure to increase stocks seems to indicate they feel assured that next winter coal will be as cheap as ever and as easy to buy. The stocks now reported, it will be understood, are really inconsequential. Since the depletion by the 1922 strike the lowest stocks ever reported were 36,000,000 tons, for May 1, 1926. Approximately that amount is considered an irreducible minimum.

The analysis of coal consumption does not give favorable indication for the future of demand. Weekly consumption during the third quarter of this year was 8,246,000 tons, which is a trifle less than in the same period of 1927 and 9 per cent less than in the period of 1926. Yet we are assured by an imposing array of statistics that industrial activity has been much greater than a year ago and somewhat greater than two years ago. It is plain that year by year coal is being utilized much more efficiently. This fact and the growth of substitutes, both for heat and power, give little promise of increasing tonnage in the future.

It is now several years since "the coal problem" became pressing. Government aid was talked of, but while Congress was willing to spend a large sum of money for information by way of "the fact finding commission," it was unwilling to spend time on the report or on contriving a measure of relief.

It was said, with seeming reason, that if the Government did not help, the coal industry eventually would get some relief by economic forces, by the painful process of elimination, for there were "too many mines and too many miners." A good bit of time has passed and something should have happened, but it has not. Perversely enough coal companies have failed to fail. Had they done so, their mines would still be there, although subject to deterioration; but as it is they have kept up their properties. Of late various idle operators have considered starting up, thinking they might lose less in operation than the cost of upkeep when idle.

We have the production figures year by year of mines arranged in groups according to capacity, and these show no definite drift of production from small to large mines. The smaller mines maintain their relationship. Experts are not surprised by these statistics, remarking that of course many small mines survive because they have lower overhead per ton.

The coal industry is not making profits. Districts formerly union find no difficulty about labor supply. Apparently their trouble is the competition of Southern fields, with considerably lower wages, but the operators in the latter are not making profits either. Several

years have now elapsed with no substantial progress toward a righting of the coal situation. Talk is renewed of the need of Congress doing something, but with little reason to hope that the something really will be done.

The Trade Commission and Business

THE new relation that the Federal Trade Commission is assuming toward business is commanding widespread attention. The point of view of that Government body was set forth by Commissioner Myers in an address published in THE IRON AGE last week. It is amplified this week in an interview with the commission's director of trade practice conference, M. Markham Flannery. The point is made that the members of an industry are as entitled to fair competition as the public, in whose interests the Federal Trade Commission law was enacted. Protection of competitor against competitor, according to this view, is in no way inconsistent with the commission's primary obligation to those who buy the products of an industry.

The excellent work that trade associations have done in raising the standards of products and business conduct cannot be fully effective, it is argued, without Government aid. So long as a recalcitrant minority refuses to cooperate, the efforts of the majority are impeded. The commission sees no obstacles to its acting against a minority for practices illegal per se, but whether it can enforce rules adopted by an industry that are aimed at methods not yet held unlawful is a question that the courts have not yet passed on.

So far trade association rules have been focused on

maintaining fair play in competition. To invite the Government to enforce such regulations, no matter how desirable they may be, is a matter of policy calling for careful analysis and unhurried judgment. In the opinion of Virgil Jordan of the National Industrial Conference Board, as expressed in an address before the National Founders Association published in this issue, Government intervention in business inevitably leads to extremes in bureaucratic control. He assumes, however, that trade association activity is headed toward regulation of prices and production. It may indeed be a fact that such group action, once proved effective, would not stop with the mere stamping out of competitive excesses. In such a case it is easy to conceive of Government control taking the course that he predicts.

When Mr. Jordan condemns regulation of competition on the ground that it would stabilize profits and thereby lead to over-investment and restriction of consumer purchasing power, he opposes the view held by most industrialists. A primary aim of efforts to wipe out unfair competition is to eliminate some of the most serious causes of waste in production. Every step toward greater economy is a move toward cheaper output and wider consumption.

Consumption can best be brought into balance with production, according to the Conference Board speaker, by a better banking policy, but he admits that no prompt improvement in that direction is in prospect. Nevertheless his warning against the extension of Government control of business deserves as careful consideration as the presentation of the Trade Commission's position. It is only through a threshing out of this question that industry can intelligently decide its policy.

CORRESPONDENCE

Terms Cash Discounts as Graft

To the Editor: After 40 years' experience in business I am of the opinion that cash discounts are in the same class with tips, bribes and other kinds of graft that are levied for inadequate consideration. That is really what is wrong with them. Tipping may be a kindly act, but when it is exacted mechanically for a trifling service, or for none at all, it is graft.

There was a reasonable basis for cash discount in the days when trade credits ran to 4 or 6 months, with open accounts, and no way of exerting pressure on the debtor except by dunning him. It was worth 5 per cent to get the money in 30 days as compared with an indefinite credit that might run into a year. But even then goods had to be marked to stand it, and if margins were not greater, expenses were less.

When I began work as an office boy in an old-fashioned wholesale house, the usual terms were 5 per cent in 30 days or 4 months net. It meant that 5 per cent was paid for three months' time, and when I remarked to the bookkeeper that it was equal to 20 per cent per annum, he told me to keep my opinions until they were asked for! I mention this because the same kind of reaction still persists. Executives refuse to consider a fact of percentage if it does not fit in with preconceived ideas. Sometimes I wonder what proportion of business men really understand the term "per cent."

No doubt the principle of cash discount is as old as commerce—that is, the buyer who goes to market with money

in his purse expects to do better than the buyer who must ask for credit, or who accepts a term of credit because it is customary. But this falls down when competition and trade use compel the figuring of prices on a cash basis. In primary markets prices are quoted for cash. Go into the country with a cattle buyer who is picking up a carload of steers. There will be bargaining, but once the cattle are delivered as agreed the buyer pulls out a fat wallet and pays in currency. If very well known, he may be able to pay by check, but he must not expect to do this when buying from a stranger. Cash is cash, and no nonsense about it. Imagine the seller being asked for a "cash" discount.

Now it may be said generally that raw materials are sold for cash, and sometimes the rule is enforced strictly—cash against delivery or against documents; or what our Quebec friends call "argent comptant"—a very expressive phrase which means "money counted out." But the inconvenience of this has brought into use a limited term of credit, usually 30 days, which is elbow room in terms of time. It is enough to permit the work of billing to be done accurately as goods are shipped, to allow for transit over a considerable radius, and for eventual delivery to the buyer, who is presumed to be doing business in an orderly manner, which means that incoming goods are checked and inspected and the account certified for payment. Then, in due course, it will be paid—and there ought not to be any necessity for bribery to get it paid. To say that a discount of 2 per cent is "earned" by payment in 10 days instead of thirty days is nonsense. It is not earned, it is graft!

No argument about including the 2 per cent in the cost of goods gets over the fact that 2 per cent for 20 days is at the rate of 36.5 per cent per annum. Now if call money touched 36 per cent for even a day, Wall Street would

have a panic and the Exchange would close for a week to cool the hot bearings. It has been much advertised that surplus working capital of corporations has lately been employed as call money, and it looks like good business to make it earn 6 or 7 per cent. But not much imagination is required to visualize a corporation lending money on call which is in part obtained from customers who are taking a discount of 2 per cent for 10 days. And grave execu-

tives are knitting their brows over zigzags to find out what is wrong with business. They might ask the office boy, or, if that species is extinct, perhaps the bookkeeper might be consulted. A man who stands at a desk working at figures all day has no time for illusions about the facts of percentage.

WILLIAM Q. PHILLIPS.

Sec'y-Treas. Doherty Mfg. Co., Ltd.

Sarnia, Ont.

Waste Elimination Week Brings Results

Steel Corporation Gets Wealth of Suggestions, Many Considered Worthy of Cash Awards, in Contest

WASTE elimination week, which was conducted in all plants of the United States Steel Corporation Oct. 15 to 20, gave impressive results, which, as time goes on, should result in substantial savings in production costs. The general response from employees may be realized from the fact that in one group of plants of the American Steel & Wire Co., those of the Worcester district, there were almost as many suggestions from employees as there were men employed. The number of men was 4700 and the number of suggestions was 4424. Fully one-half of these are considered useful and more than 100 of them have been recommended for consideration for financial award.

In this campaign waste was construed to mean anything which, in the final analysis, causes a loss in dollars and cents. It might be the useless expenditure of time, energy, money, materials; of water, steam, light, heat; of human life or limb.

The Worcester district has been conducting for two years a suggestion system regarding waste elimination, in which employees are urged to cooperate by contributing ideas. In the six days of intensive waste elimination week more suggestions were received than in the two years of the continuous system.

The first step was the general announcement to employees of the works that the campaign would be carried through, everyone being urged to cooperate, and that cash awards would be made for novel and outstanding suggestions. The superintendents and foremen were called together by the assistant district manager, who outlined the plan and what it was proposed to do in stimulating interest among the workers. The foremen in turn addressed their men and aroused their interest.

Of the 4424 suggestions received, 3 per cent were considered worthy of cash awards, in the opinion of the local management, and this recommendation was forwarded to headquarters. This percentage has been the common experience in industries which have conducted similar campaigns. But the accrued benefits to the business were by no means confined to the suggestions of the 100 whose ideas were of novel and outstanding value. Others, less distinctive, are useful to the management.

Many of these called attention to lapses in practice, where the human factor has permitted prescribed methods and regulations gradually to become ineffective.

Most of the more important suggestions may be divided into two classes, practice and equipment. Elimination of processes or the combining of processes received sound, practical attention. The most economical use of materials came in for important consideration, particularly in pointing out that as good or better results in certain cases could be obtained by using a different kind or grade of material. There were other important suggestions concerning the elimination of scrap, always a real problem in the wire industry. Another vital subject of suggestion was that of changes in equipment to make more efficient. Accident prevention and working conditions, such as light and sanitation, came in for a limited amount of comment, but the years of concentrated attention which the Steel Corporation has given to this branch of management has made this field of suggestion a lean one.

Taylor Society to Meet Dec. 5 to 7

The annual meeting of the Taylor Society will be held at Rumford Hall, 50 East Forty-first Street, New York, Dec. 5 to 7 inclusive. On Friday afternoon a visit to the plant of the Sperry Gyroscope Co. in Brooklyn has been arranged for production executives and a meeting of teachers of management has been planned for Dec. 8. The tentative program for the convention includes the following papers:

"Variations in the Applications of Engineering Technique to Management As Illustrated by Variable, Intermittent and Continuous Processing," by G. E. Schulz, Armstrong Cork Co., Lancaster, Pa.

"The Marketing Problems of a Manufacturer of Resale Goods," by Willard E. Freeland, Freeland & Warren, Boston.

"Some Basic Principles of Cost Accounting," by John H. Williams, industrial engineer, New York.

"Some Observations on Workers' Organizations," by Morris L. Cooke, consulting management engineer and president Taylor Society.

"How Scientific Management Can Promote a New Functional Status for Workers," by Geoffrey C. Brown, consulting engineer, East Orange, N. J.

"Suggestions Concerning a More Com-

prehensive Approach to the Problem of the Shorter Work Day and the Shorter Work Week," by Dr. H. S. Person, managing director Taylor Society.

Cleveland Company Goes Into Receivership

The Variety Iron & Steel Co., Cleveland, has been placed in the hands of a receiver on application of the Cleveland Trust Co. Albert R. Manning, an attorney, is the receiver. The bank in its petition stated that the company's assets far exceeded its liabilities and that it is solvent provided assets are properly protected. The Variety company is a fabricator of heavy plate work, blast furnace work and structural steel work.

Republic's New Financing— Directors Added

The Republic Iron & Steel Co., Youngstown, has announced financing plans to provide funds for expanding the company's plants and its business. The company will offer for sale 100,000 shares of new common stock at \$65 per share, and proceeds will be employed for electrification of the Youngstown properties, probable additions to the Birmingham plant, and further exploitation of the tube welding process acquired through purchase of Steel & Tubes, Inc. Stockholders of record of Dec. 15 are entitled to subscribe for one share of the new stock for each six shares now owned. Stock unsubscribed for will be taken over by a banking syndicate. The stock must be paid for by Jan. 3, 1929.

The company has increased its board of directors from 11 to 14 by the election of Philip Wick, Youngstown, and William G. Mather and Myron Wick, Cleveland. Philip Wick was formerly vice-president and a director of the Trumbull Steel Co., now a part of the Republic company, and Myron Wick has been active in Steel & Tubes management. Of Republic's 14 directors, six are from Cleveland, five from Youngstown, two from Pittsburgh, representing the Mellon group, and one, John A. Topping, chairman of the board, from New York.

A motion picture film showing arc welding applied to erecting the structural steel for the Upper Carnegie Building, Cleveland, may be obtained gratis on application to the Lincoln Electric Co., Cleveland.

Iron and Steel Markets

Steel Prices Have Easier Tone

Bar Quotations for Current Quarter Continued for Next
Quarter—Concessions in Hot Strip—
Decline in Production Halted

STEEL prices are easier, but the decline in production has been checked. With the general trend of specifications downward as the year-end approaches, releases by the automobile industry continue to act as an offsetting influence. Construction work and railroad cars are also taking more steel.

Among the primary materials, pig iron still shows strength in the Central West and South, but is less buoyant in the East. Heavy melting scrap at Pittsburgh, after declining for four consecutive weeks, has undergone no further change in the past seven days, and a somewhat steadier price situation obtains in other market centers. Prompt furnace coke at Connellsville has receded 10c. a ton and is now 15c. below the peak reached in the middle of October.

Steel bar prices reflect a marked change in the condition of mill backlogs. Buyers no longer find it necessary to pay premiums for early shipments, and the market is again quotable at 1.90c. to 2c., Pittsburgh, compared with 1.95c. to 2c. when the advantage was with the mills. The possibility of an advance for first quarter has also passed, with the opening of books by two producers at the same prices that rule on current contracts. Cold-finished bar prices likewise have been continued for the next quarter, and similar action is expected on plates and structural shapes.

Large buyers of hot-rolled strip have succeeded in placing first quarter contracts at concessions of \$2 a ton. This product, however, under the new bases and extras recently announced, had been advanced \$3 to \$5 a ton over current invoice prices.

In contrast, sheet prices for first quarter have held in contracts placed thus far, although mills continue to make sales for immediate specification at \$2 a ton less.

Territorially also a mixed situation is indicated, with an advance of \$2 a ton on plates, shapes and bars reported from Birmingham.

Steel output shows little change. The rate for the Greater Pittsburgh district remains at 80 per cent, while Chicago continues on an 82 per cent basis. The average for Steel Corporation subsidiaries has risen to about 82 per cent, compared with a recent rate of 80 per cent.

The recovery in steel specifications from the automobile industry, noted at Cleveland a week ago, has continued and additional first quarter contracts have been placed. The increased steel requirements are to a large extent for new models to be brought out Jan. 1.

Large projects are sustaining the demand for steel in the construction field. For a third week structural steel contracts have been heavy, the current total being 58,600 tons. Of this amount, one contract—for a bridge

between Staten Island and New Jersey—calls for 26,500 tons. A New Jersey pipe line, on which bids will be closed Dec. 6, will require 38,000 tons of plates.

Indicative of the growing steel requirements for ships is an inquiry from a New Jersey builder for prices on 12,000 tons of ship plates and 4000 tons of shapes.

Railroad equipment buying for the week included a total of 2900 freight cars, of which the Wabash bought 2000 and the Chicago & North Western 700. Among new inquiries for more than 4000 cars were 2500 for the Louisville & Nashville, 1025 for the Santa Fe and 250 for the Rock Island.

The current rail buying movement is half over, judged by the tonnage booked by Chicago mills. The Ensley, Ala., mill, which resumed operations Nov. 24, has received an order for 13,000 tons from the Southern Pacific.

Tin plate specifications have increased, following the announcement of the price for the first half of 1929, and mill operations now average 80 per cent, compared with 70 per cent a month ago.

Cleveland reported another good week in sales of foundry and malleable pig iron, which totaled 46,000 tons, and one producer in that city is booked full for the first quarter. Bookings at Cincinnati aggregated 31,000 tons. Extra demands of melters have enabled Valley iron to penetrate as far west as South Bend, Ind., resulting in a 50c. advance in Valley foundry grade to \$18, furnace. Virginia foundry iron, following the lead of Birmingham iron, has gone up 25c. a ton to \$20.25, base furnace. Sales at the new price of \$16.50, Birmingham, have encouraged one Alabama furnace to raise its quotation another 50c. a ton.

A less favorable situation exists along the Atlantic seaboard where the last advances announced by Buffalo and Eastern furnaces are no longer generally adhered to.

The increase in silvery pig iron and Bessemer ferro-silicon by Jackson County makers was not uniform, as reported last week, since one producer marked up quotations only \$1 a ton compared with \$2 by the other.

Machine tool buying is heavy, outstanding orders including two of more than \$300,000 each from domestic buyers and a third of \$100,000 from Sweden.

Machinery exports for the 10 months ended with October established a new record and were larger than for any entire year between 1921 and 1927.

The 10 months' exports for iron and steel, excluding scrap, were the largest since 1921.

THE IRON AGE composite price for pig iron has advanced from \$18.54 to \$18.59 a ton. The finished steel composite has declined from 2.369c. to 2.362c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Nov. 27,	Nov. 20,	Oct. 30,	Nov. 29,
	1928	1928	1928	1927
No. 2, foundry, Philadelphia.....	\$21.26	\$21.26	\$20.76	\$19.75
No. 2, Valley furnace.....	18.00	17.50	17.50	17.25
No. 2, Southern, Cin'tl.....	20.19	20.19	19.94	19.69
No. 2, Birmingham.....	16.50	16.50	16.25	16.00
No. 2 foundry, Chicago*.....	20.00	20.00	19.50	18.50
Basic, del'd eastern Pa.....	19.75	19.75	19.75	19.00
Basic, Valley furnace.....	17.50	17.50	17.50	17.00
Valley Bessemer, del'd P'gh.....	20.01	20.01	19.76	19.76
Malleable, Chicago*.....	20.00	20.00	19.50	18.50
Malleable, Valley.....	18.25	18.25	18.00	17.50
Gray forge, Pittsburgh.....	19.26	18.76	18.76	18.51
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$42.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh.....	33.00	33.00	33.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	38.00
O.-h. billets, Phila.....	38.30	38.30	37.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	40.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.....	1.90	1.90	1.90	1.80

Finished Iron and Steel,				
<i>Per Lb. to Large Buyers:</i>				
	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, Pittsburgh.....	1.90	1.95	1.95	1.80
Steel bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, New York.....	2.24	2.29	2.29	2.14
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	1.90
Tank plates, New York.....	2.22½	2.22½	2.22½	2.14
Beams, Pittsburgh.....	1.90	1.90	1.90	1.80
Beams, Chicago.....	2.00	2.00	2.00	1.90
Beams, New York.....	2.19½	2.19½	2.19½	2.14
Steel hoops, Pittsburgh.....	2.10	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

	Nov. 27, 1928	Nov. 20, 1928	Oct. 30, 1928	Nov. 29, 1927
	Cents	Cents	Cents	Cents
Sheets, Nails and Wire,				
<i>Per Lb. to Large Buyers:</i>				
Sheets, black, No. 24, P'gh....	2.75	2.75	2.75	2.75
Sheets, black, No. 24, Chicago				
dist. mill.	2.85	2.85	2.85	2.90
Sheets, galv., No. 24, P'gh....	3.50	3.50	3.50	3.60
Sheets, galv., No. 24, Chicago				
dist. mill.	3.60	3.60	3.60	3.75
Sheets, blue, 9 & 10, P'gh....	2.00	2.00	2.00	2.10
Sheets, blue, 9 & 10, Chicago				
dist. mill.	2.10	2.10	2.10	2.15
Wire nails, Pittsburgh.	2.55	2.55	2.55	2.50
Wire nails, Chicago dist. mill. .	2.60	2.60	2.60	2.55
Plain wire, Pittsburgh.	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill. .	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh.	3.20	3.20	3.20	3.20
Barbed wire, galv., Chicago				
dist. mill.	3.25	3.25	3.25	3.25
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.....	\$17.00	\$17.00	\$17.75	\$14.50
Heavy melting steel, Phila.....	15.50	15.50	16.00	13.50
Heavy melting steel, Ch'go.....	14.50	14.50	14.50	11.50
Carwheels, Chicago.....	14.25	14.25	14.25	12.25
Carwheels, Philadelphia.....	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh.....	14.50	14.50	15.50	14.25
No. 1 cast, Philadelphia.....	16.25	16.25	17.50	16.00
No. 1 cast, Ch'go (net ton).....	15.50	15.50	15.50	13.50
No. 1 RR. wrot., Phila.....	15.50	15.50	15.50	15.25
No. 1 RR. wrot, Ch'go (net).....	13.25	13.00	12.75	9.75

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt.....	\$2.75	\$2.85	\$2.90	\$2.75
Foundry coke, prompt.....	3.75	3.75	3.75	3.75

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	16.12½	16.12½	16.25	13.75
Electrolytic copper, refinery...	15.75	15.75	15.75	13.50
Zinc, St. Louis.....	6.35	6.25	6.25	5.90
Zinc, New York.....	6.70	6.60	6.60	6.25
Lead, St. Louis.....	6.22½	6.17½	6.32½	6.10
Lead, New York.....	6.35	6.35	6.50	6.40
Tin (Straits), New York.....	52.87½	51.12½	49.25	59.12½
Antimony (Asiatic), N. Y.....	10.00	10.25	10.50	10.87½

Pittsburgh

Bars, Plates and Shapes May Not Be Advanced for First Quarter—Foundry Pig Iron Higher

PITTSBURGH, Nov. 27.—Developments in steel prices engage attention this week. Some makers of steel bars have announced a continuance of this quarter's price on first quarter contracts, and it now appears that no attempt will be made to advance prices on bars, plates or shapes. These lines have had a total advance since a year ago of from \$3 to \$4 a ton over the invoice prices then current, and in this respect bars, plates and shapes have outstripped most other finished steel products.

Hot-rolled strips, with the assistance of a new card of extras, are quoted well up as compared with where they have been much of the time during this year, but late advices suggest that with the opening of negotiations for large tonnages it has been necessary for producers to modify their price ideas.

Makers of cold-finished steel bars are continuing the present price on first quarter contracts. There had been some suggestions of an advance, but failure of the price of hot-rolled bars to move to higher ground removed an important prop. Nothing has developed in connection with first quarter wire and nail prices; an advance may come, but whether it will

be through an out and out raising of prices or through a recasting of sales methods is not yet clearly defined.

Strong demands for foundry iron from consuming points not recently supplied by Valley furnaces, on account of unfavorable freight rates, have stiffened the price to \$18 for the base grade in spite of rather limited demands from Pittsburgh and other points that constitute the usual market for Valley iron.

19. No marked recession has come in steel works and rolling mill engagement in this and nearby districts, but the operating activity is due chiefly to the momentum of the October rush, since in almost all products there has been a substantial let-

down this month in new orders and specifications. The approach of the end of the year has intensified the desire of consumers for light inventories, and some restriction of demand, furthermore, is common to this time of the year when consumption usually is on a declining scale. November has been light in new tonnage releases compared with October. Although there has been a drop of 10 points in ingot production, it is believed that unfilled obligations have decreased.

Pig Iron.—Valley pig iron still is showing more activity for shipment westward than toward or into the Pittsburgh district. Most of the recent sales of foundry iron have been to melters in Ohio, while several sales of foundry and malleable are reported for shipment to Indiana points. A Valley merchant furnace, which will be blown in about Dec. 15, will start with a backlog of approximately 10,000 tons of basic iron and about 15,000 tons of foundry and malleable; the basic iron is understood to be for an eastern Ohio steel plant, and of the other grades only a few small lots are to be shipped into this district. The Pittsburgh district

proper has contributed only a small part of the total bookings of Valley furnaces over the past few months. None of the Valley producers, however, lacks a backlog, and while business lately has been a little slow, there is a common tendency to ascribe this condition to the close proximity of the end of the year and the desire of melters to keep down inventories. So long as foundries which serve the motor car industry keep as busy as they are at present and their regular sources of supply cannot meet their requirements, there is sure to be a demand upon the Valley furnaces, which, until freight rates intervened, supplied many of the points to which they now are shipping. This demand has stiffened the Valley foundry iron price to \$18 for the base grade. Only a little has been sold into Pittsburgh at that price, but it is so readily obtainable elsewhere that producers are indisposed to sell here for less. No fresh business of consequence has developed in basic iron, and sales of malleable and Bessemer iron have been chiefly in small lots. The Carnegie Steel Co. recently took off one of its Duquesne furnaces.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.50 to \$18.00
Bessemer	18.25 to 18.50
Gray forge	17.50
No. 2 foundry	18.00
No. 3 foundry	17.50
Malleable	18.25 to 18.50
Low phos., copper free....	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Semi-Finished Steel.—Not much variation is noted in the rate of specifications on contracts for billets, slabs and sheet bars, although in the past week or so there has been a recession in sheet and strip mill operations. Negotiations for first quarter tonnages are yet to get actively under way; non-integrated sheet makers await developments on the higher price schedule announced a few weeks ago. Strip makers are asking higher prices for first quarter than they are netting on fourth quarter contracts, but the open market price of billets and slabs has been left at \$33, Pittsburgh or Youngstown, for the base dimensions. That, however, would mean higher net prices in the event that makers fully apply the chemical

extras, which most of them announced last August and September. Wire rods are firmly held at \$42, base Pittsburgh or Cleveland.

Bars, Plates and Shapes.—While formal announcements as to first quarter contract prices have not been made by the larger producers, the common belief is that the prices for this quarter will be continued. Some makers of bars have indicated a willingness to take first quarter business at 1.90c. to 2c., base Pittsburgh, and this willingness has taken the form of instructions to salesmen by at least one maker. As most makers now are pretty well caught up with orders and can make prompt deliveries, buyers requiring early shipments find it unnecessary to pay service premiums. The market, accordingly, is again quotable at from 1.90c. to 2c., base, against 1.95c. to 2c., when the advantage was with the mills. Structural steel lettings in this area remain rather small in the aggregate and individual jobs commonly are for small tonnages.

Rails and Track Accessories.—Interest centers in the distribution by the New York Central Lines of the spikes, tie plates and track bolts to go along with the rails recently ordered. Bids closed today (Nov. 27) on these track supplies. Business otherwise is slow.

Wire Products.—Business compares favorably with that at this time last year. Frequent suggestions of price advances are believed to lend some stimulation to specifications at a time when consumption usually is light and distributors are trying to reduce their inventories. No formal announcement has been made as to first quarter nail and wire prices.

Tubular Goods.—Pipe business does not vary much in volume or as to distribution. Butt-welded pipe sales show some seasonal contraction, as requirements for gas, water and heating usually fall off at this time of year. There is a fairly steady demand for oil country pipe, in which seamless pipe is figuring to a greater extent than ever before. In backlog business the mills are better off in line pipe than in other classes. Demand for boiler

tubes is fairly active. Mechanical tubing, although not as active as it was recently, is doing well.

Sheets.—The close proximity of the end of the year, with its inventory-taking, is beginning to be reflected in sheet orders and specifications. Some of the motor car builders are seeking to defer deliveries on existing contracts until late next month or the first of January and other consuming industries appear less anxious for shipments. It is said that on first quarter tonnages no resistance to the new prices worthy of notice has been encountered, but it is a little early for a real test of the market. Former prices still rule on tonnage for shipment over the remainder of the year on either contracts or fresh purchases. The market lacks real strength in galvanized sheets, but Monday's advance in the price of spelter may possibly exert a steadying influence on prices.

Tin Plate.—With the price for the first half of next year settled, more tonnage is reaching producers. Mill operations, which a month ago were down to about 70 per cent, now are up to approximately 80 per cent, with the outlook for a further gain as the year draws to a close.

Cold-Finished Steel Bars and Shafting.—Fairly good movement on contracts is noted, but new business is light and buyers are showing no great interest in first quarter requirements. Prices for that period have not been named, but as the price of hot-rolled bars is likely to remain where it is, the common expectation is that there will be no change on cold-finished bars.

Hot-Rolled Flats.—Makers of strip are formally announcing 1.90c., base Pittsburgh, as the first quarter price on strips wider than 6 in. to and including 24 in., and 2c., base, for widths of less than 6 in. Not much business for that period yet has been concluded. Current demands are somewhat smaller than they were recently, owing to the contraction in the general requirements of motor car builders.

Cold-Rolled Strips.—Demands are lighter, but still are well in excess of those at this time last year. Makers

THE IRON AGE Composite Prices

Finished Steel

Nov. 27, 1928, 2.362c. a Lb.

One week ago.....	2.369c.
One month ago.....	2.369c.
One year ago.....	2.307c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.369c.,	Oct. 30:	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4:	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5:	2.403c.,	May 18
1925	2.560c.,	Jan. 6:	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15:	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24:	2.446c.,	Jan. 2

Pig Iron

Nov. 27, 1928, \$18.59 a Gross Ton

One week ago.....	\$18.54
One month ago.....	18.25
One year ago.....	17.59
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	\$18.59,	Nov. 27:	\$17.04,	July 24
1927	19.71,	Jan. 4:	17.54,	Nov. 1
1926	21.54,	Jan. 5:	19.46,	July 13
1925	22.50,	Jan. 13:	18.96,	July 7
1924	22.88,	Feb. 26:	19.21,	Nov. 3
1923	30.86,	Mar. 20:	20.77,	Nov. 20

are firm at 2.85c., base Pittsburgh, on new business and also for first quarter contracts. Buyers whose requirements run to small lots and whose specifications are exacting are asked to pay 2.95c., base.

Cold-Finished Steel Bars and Shafting.—Leading makers have opened books for first quarter contracts at 2.20c., base Pittsburgh or Chicago, and 2.25c., base Cleveland, reaffirming the present quarter's price. It has become apparent in the past few days that there will be no change in the first quarter contract price of hot-rolled bars. March 15 has been named as the closing date for specifications on first quarter contracts. Current demands are moderate, but a steady movement on fourth quarter contracts is reported.

Hot-Rolled Flats.—The market on strips has become somewhat unsettled by reports of concessions to tonnage buyers on first quarter contracts. Several large contracts with motor car builders are under negotiation and are reported to have brought out concessions of as much as \$2 a ton from the prices named by makers in formally opening their books a few days ago. In these announcements widths up to 6 in. were quoted at 2c., base Pittsburgh, and for 6 in. to and including 24 in., 1.90c., base. Business in strips lately has been dwindling and the price shading is probably the result of the desire for orders, and it is probable also that producers encountered some difficulty in convincing large buyers that they should pay \$3 to \$5 a ton above present invoice prices.

Coke and Coal.—The market is weaker on spot furnace coke, and sales at more than \$2.75 per net ton at ovens have been out of the question lately. Production has not declined as rapidly as the demand for spot tonnages, and the answer is in the lower price. Producers, however, look for improvement next month.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.70c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	\$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'l'd, base per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

counting on the starting of three blast furnaces to take up the slack, while heating and domestic demands are expected also to provide an outlet for some good-sized lots of Connells-ville coke. Spot foundry coke is going rather slowly, as consumers are disposed to keep their stocks within bounds for the year-end inventories. Some 72-hr. coke is available at \$3.50, but more commonly \$3.75 is the minimum on good brands. The coal market is very weak. With less sized coal now required as the lake shipping season ends, supplies of slack are expected to grow smaller and prices to stiffen.

Old Material.—Nothing has occurred to change scrap iron and steel prices this week. Steel makers are not much interested in fresh supplies, but they are insisting on deliveries on old orders and this creates a dealer demand that is sufficient to keep the market fairly firm. It is still said that heavy melting steel cannot be sold to consumers at over \$17, but also that dealer bids of less do not bring out much material. Steel works operations are off about 10 points from the recent peak; a desire to keep down inventories is another reason for light mill purchasing. Foundry grades are dull. Blast furnace scrap is firm owing to light offerings and more remunerative prices west of this district. The December scrap list of the Baltimore & Ohio Railroad contains 13,910 gross tons, including 6000 tons of No. 1 rails and 2200 tons of No. 1 heavy melting steel.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:		
Heavy melting steel	.....	\$17.00
Scrap rails	.....	17.00
Compressed sheet steel	.....	17.00
Bundled sheets, sides and ends	.....	\$15.50 to 16.00
Cast iron carwheels	.....	15.00 to 15.50
Sheet bar crops, ordinary	.....	17.00 to 17.50
Heavy breakable cast	.....	13.50 to 14.00
No. 2 railroad wrought	.....	17.00
Hvy. steel axle turnings	.....	15.00
Machine shop turnings	.....	10.50 to 11.00
Acid Open-Hearth Grades:		
Railr. knuckles and couplers	.....	18.50 to 19.00
Railr. coil and leaf springs	.....	18.50 to 19.00
Rolled steel wheels	.....	18.50 to 19.00
Low phos. billet and bloom ends	.....	20.50 to 21.00
Low phos., mill plates	.....	19.00 to 19.50
Low phos., light grade	.....	18.00 to 18.50
Low phos., sheet bar crops	.....	19.00 to 19.50
Heavy steel axle turnings	.....	15.00
Electric Furnace Grades:		
Low phos. punchings	.....	18.50 to 19.00
Hvy. steel axle turnings	.....	15.00
Blast Furnace Grades:		
Short shoveling steel turnings	.....	12.00 to 12.50
Short mixed borings and turnings	.....	12.00 to 12.50
Cast iron borings	.....	12.00 to 12.50
No. 2 busheling	.....	9.50 to 10.00
Rolling Mill Grades:		
Steel car axles	.....	20.00 to 21.00
No. 1 railroad wrought	.....	13.00 to 13.50
Sheet bar crops	.....	18.00 to 18.50
Cupola Grades:		
No. 1 cast	.....	14.50 to 15.00
Rails 3 ft. and under	.....	17.50 to 18.00

The Danville Structural Steel Co., Inc., Danville, Pa., maker of steel tubing, angles, channels, special shapes, reinforcing bars, fence posts, etc., has removed its New York office to 11 West Forty-second Street.

Heavy Orders for Steel Furniture

WASHINGTON, Nov. 27.—Increasing \$495,091, orders for steel furniture stock goods in the "business group" were valued at \$3,184,100 in October, against \$2,689,009 in September, according to reports received by the Department of Commerce from 34 producers. This was the largest total since last March and the fourth largest ever recorded. Shipments were valued at \$3,155,353, compared with \$2,754,135, while unfilled orders were valued at \$2,089,956 and \$2,061,856 respectively. Orders in this group for the 10 months ended with October were valued at \$29,678,981, compared with \$25,433,799 for the corresponding period of last year, while shipments were valued at \$29,068,316, against \$25,509,006.

Orders for shelving furniture in October were valued at \$958,736, an increase of \$159,876 over those received during September, according to reports received from 16 companies. This made the largest total on record. Shipments were valued at \$953,804, against \$678,422, and unfilled orders were valued at \$760,104, compared with \$753,813. For the 10 months ended with October orders were valued at \$7,897,123, against \$6,157,083 for the corresponding period of last year while shipments were valued at \$7,590,062 and \$6,095,608 respectively.

New England Activity

The output of forged automobile crankshafts by the Wyman-Gordon Co., Worcester, Mass., this year will exceed that of 1927, and will establish a new high record.

The Moore Drop Forge Co., Springfield, Mass., the largest independent New England drop forge plant, is operating at 100 per cent of capacity on Ford automobile parts.

The New London Ship & Engine Co., New London, Conn., has been awarded a contract for two ferryboats by the State of New York. The boats will operate between New York and Wards Island, and are scheduled to be completed in July, 1929.

Grover Lassen, Hartford, Conn., has agreed to pay the indebtedness of the H. D. Smith Drop Forging Co., Southington, Conn., manufacturer of hand tools. The plant was closed last January with \$45,000 in bills outstanding. It is assumed the company will resume operations before the end of the year.

Necessary steps have been taken for the reorganization of Billings & Spencer Co., Hartford, Conn. It has been voted to liquidate the company and to reincorporate as the B. & S. Co. until after Jan. 1, when the corporate name will be as originally. Officers of the new company are: David J. Post, chairman of the board; Frederick C. Billings, president; A. H. Deute, vice-president and general manager; Charles T. Jones, secretary and assistant treasurer.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms	
	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	\$33.00
Rerolling, 4 in. and under 10 in., Youngstown	33.00
Rerolling, 4 in. and under 10 in., Cleveland	\$33.00 to 34.00
Rerolling, 4 in. and under 10 in., Chicago	35.00
Forging quality, Pittsburgh.....	38.00

Sheet Bars	
(Open hearth or Bessemer)	
	Per Gross Ton
Pittsburgh	\$33.00 to \$34.00
Youngstown	33.00 to 34.00
Cleveland	33.00 to 34.00
Slabs	
(8 in. x 2 in. and under 10 in. x 10 in.)	
	Per Gross Ton
Pittsburgh	\$33.00
Youngstown	33.00
Cleveland	\$33.00 to 34.00

Skelp	
(F.o.b. Pittsburgh or Youngstown)	
	Per Lb.
Grooved	1.90c. to 2.00c.
Universal	1.90c. to 2.00c.
Sheared	1.90c. to 2.00c.
Wire Rods	
(Common soft, base)	
	Per Gross Ton
Pittsburgh	\$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores	
Lake Superior Ores, Delivered Lower Lake Ports	
	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian.....	10.00c.
Iron ore, Swedish, average 66% iron.....	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus.....	38c.
Manganese ore, Brazilian, African or Indian, basic 50%	37c. to 38c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$11.40 to \$12.00
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.

Ferromanganese	
	Per Gross Ton
Domestic, 80%, seaboard.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00
Spiegeleisen	
	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$30.00 to \$33.00
Domestic, 16 to 19%.....	29.00 to 32.00

Electric Ferrosilicon	
	Per Gross Ton Delivered
50%	\$83.50
75%	130.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
12%	\$39.00
14 to 16%.....	45.00

Bessemer Ferrosilicon	
F.o.b. Jackson County, Ohio, Furnace	
	Per Gross Ton
10%	\$31.00 to \$32.00
11%	33.00 to 34.00
12%	\$35.00 to \$36.00

Silvery Iron	
F.o.b. Jackson County, Ohio, Furnace	
	Per Gross Ton
6%	\$24.00 to \$25.00
7%	25.00 to 26.00
8%	26.00 to 27.00
9%	27.00 to 28.00
10%	\$29.00 to \$30.00
11%	31.00 to 32.00
12%	33.00 to 34.00

Other Ferroalloys	
Ferrotungsten, per lb., contained metal del'd	98c. to \$1.05
Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories	
Fluorspar	
	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$18.00
No. 2 lump, Illinois and Kentucky mines..	18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid.	18.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/4% silica, f.o.b. Illinois and Kentucky mines.....	32.50

Fire Clay Brick	
Per 1000 f.o.b. Works	
High-Heat Duty Brick	Intermediate Heat Duty Brick
Pennsylvania ...	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton	7.00

Silica Brick	
Per 1000 f.o.b. Works	
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick	
Per Net Ton	
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick	
Per Net Ton	
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts	
Per 100 Pieces	
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square.....	70
Hot-pressed nuts, blank or tapped, hexagons..	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	70c. to 6.75c. per lb. off list

Bolts and Nuts	
Per Cent Off List	
Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E. .	70
Stove bolts in packages, Pittsburgh.....	80, 10 and 2 1/2
Stove bolts in packages, Chicago.....	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago.....	75, 20, 10, 5 and 2 1/2
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets	
(1/2-In. and Larger)	
	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets	
(3/8-In. and Smaller)	
	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws	
(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	
	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened.	80 and 10
Milled headless set screws, cut thread.....	85 and 5
Upset hex. head cap screws, U.S.S. thread.	85 and 5
Upset hex. cap screws, S.A.E. thread.....	80, 10 and 10
Upset set screws.....	80, 10 and 10
Milled studs	70 and 5

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including 1/2 in. x 6 in. take 10 per cent lower list prices.

Chicago

Steel Buyers Exercising Greater Caution But Total Tonnage Supports Ingot Output of 82 Per Cent

CHICAGO, Nov. 27.—The railroad equipment market is active and the outlook for building construction is unusually favorable. Both of these factors lend a buoyant tone to the market. However, a condition less to the satisfaction of sellers is the caution shown by users in holding stocks to a minimum. This movement already has affected measurably the character of new business and also specifications.

Announcements of first quarter prices for plates, shapes and bars are being withheld, and purchases, some of which are to piece out last period contracts, are being made at 2c. to 2.10c. per lb., Chicago.

The chief evidence of the caution exercised by buyers is in smaller orders and specifications. These in the aggregate, however, make a fairly good showing and support the present ingot production of 82 per cent of capacity. Releases for steel are at closer range, and an increasing proportion is for the lighter products, so that the percentage of mill equipment engaged is somewhat less of a measure of production. Notwithstanding the moderate but important changes that are taking place in this market, it seems assured that 1928 will establish a record in tonnage shipped.

It is reported that the Chicago & North Western and the Northern Pacific may add 2000 cars each to recent purchases. The New York Central is in the market for large quantities of tie plates and angle bars and 25,000 kegs of spikes.

Pig Iron.—Prices are firm at \$20 a ton, local furnace, except for tonnages of boat iron offered at Milwaukee at \$19.25 a ton, Chicago basis. A Valley furnace has taken 2000 tons at South Bend, Ind., at \$21.70 a ton, delivered. This figures back to \$18, Valley. The delivered price from Chicago is \$22.05. The St. Louis producer expects to light a second stack in a week or 10 days. Books for first quarter are heavier now than they were a month before the opening of the third quarter.

Prices per gross ton at Chicago:
N'th'n No. 2 fdy., sil. 1.75 to 2.25... \$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75... 20.50
Malleable, not over 2.25 sil. 20.00
High phosphorus 20.00
Lake Super. charcoal, sil. 1.50.... 27.04
So'th'n No. 2 fdy. (all rail)..... 22.51
Low phos., sil. 1 to 2, copper free \$29.00 to 29.50
Silvery, sil. 8 per cent..... 31.79
Bess. ferrosilicon, 14-15 per cent... 46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Plates.—The feature of this market is the continued activity among purchasers of railroad equipment. In the past week Western car builders have taken orders for about 2500 cars and 1100 underframes, requiring about 40,000 tons of steel. Of special interest is an inquiry for 950 freight cars by the Santa Fe, this being taken as the forerunner of purchases which it is believed in some quarters will approximate 5000 cars. It is early for

mills to feel the effects of recent car business in any great volume, but shipping schedules are being arranged and some specifications already have been issued. Miscellaneous orders for oil storage tank construction total 3000 tons of plates. Chicago mills continue to withhold announcements of the course to be pursued in the matter of first quarter prices. Meanwhile, orders are being taken at 2c. to 2.10c. per lb., and one seller has instructed salesmen to consider future business only at the higher figure.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago

Ferroalloys.—Domestic producers of spiegeleisen are asking \$34 a ton, Hazard, Pa., for the 19 to 21 per cent grade in carloads. This market is quiet, however, and, in their efforts to attract tonnages, sellers have named as a first offer \$31 to large buyers. Contract prices for ferrosilicon are still somewhat unsettled even where small tonnages are involved.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$88.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Billets.—Rerolling billets, 4 in. and under 10 in., are moving in fair volume at \$35 a gross ton, Chicago. There is also a fair demand for forging billets, which are priced at \$40 a ton for local delivery. Several large contracts for this commodity have been overspecified, and orders for the remainder of the year are active. Current shipments are running below the rate of October.

Cast Iron Pipe.—This market continues to mark time, with practically all classes of buyers showing no interest in future needs.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$45.20 to \$46.20; 4-in., \$49.20 to \$50.20; Class A and gas pipe, \$4 extra.

Bars.—Soft steel bars remain the most active among finished steel products. Specifications are fully equal to shipments, showing no variation from a week ago. A few consumers are taking interest in first quarter requirements and several inquiries are before the trade, but sellers have not announced first quarter prices. On spot sales, prices tend to strengthen toward the upper level of the 2c. to 2.10c. range. Shipping schedules now

being prepared by automobile manufacturers give promise of an expanding demand in December, but it is generally believed that it will be the middle of January before heavy shipments will be resumed to that industry. Release orders from the agricultural trade are more liberal. Demand for forgings is widespread, but it has swung toward heavier pieces since the curtailment of orders by the automotive industry. Forward contracting in alloy steel bars is active, and producers already have built up sizable books for first quarter. Shipments from local mills represent about 75 per cent of capacity. Consumers of rail steel bars are being offered first quarter contracts at current quotations. Specifications for the week exceed shipments, which have remained steady for several weeks. Liberal specifications and sizable spot purchases are being made by the bed industry and manufacturers of barn equipment. Deliveries range from two to three weeks.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

Structural Material.—The prospect of early placing of several sizable contracts is measurably improved. The La Salle Club, Chicago, requiring 6000 tons, has been financed and work of razing old buildings on the site will be under way in a few days. Two old projects, the Fine Arts Building, Chicago, and the First Regiment Armory, have been revived, and fabricators expect plans at an early date. At Milwaukee, the Civil Courts Building, which will take about 9000 tons, is active. Taking of bids on the 15,000 tons needed for the Chicago Board of Trade Building has been postponed until Dec. 12. It is expected that the general contract for the local Naval Armory will be let before the end of the week. Railroad and State highway bridges have contributed the bulk of ordered tonnage this week. The Louisville & Nashville has placed 1300 tons and the Northern Pacific 1150 tons. Highway bridges in Indiana and Michigan account for 1000 tons. The Chicago Tribune is taking preliminary steps to add a 20-story structure to its plant, and a proposed theater and apartment structure may rise 44 stories above Michigan Avenue. Taken as a whole, the structural steel market is unusually active for this time of the year. Sales in November are not on a par with those of October, but they are well ahead of November a year ago. Competition among fabricators remains keen, notwithstanding that order books are well filled and prices remain at the low levels of recent months. With the bulk of steel already ordered against recent contracts, specifications from structural shops are light.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Rails and Track Supplies.—The Missouri-Kansas-Texas is said to have placed its 1929 rail requirements with

two Chicago mills, the Colorado maker and an Eastern mill. Forward contracting with Chicago mills has reached about half of the tonnage expected in the fall buying movement. Track supply purchases total 15,000 tons, of which 10,000 tons was in tie plates for the Missouri Pacific. Fresh inquiry totals 5000 tons. In recent days one producer has rolled billets while the finishing end of the rail mill was undergoing extensive repairs.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. **Per lb.:** Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Bolts, Nuts and Rivets.—Present quotations on these commodities have been named for first quarter contracting, which will get under way about Dec. 1. Spot buying is dull. Specifications, although somewhat influenced by the approach of the inventory period, are well sustained.

Sheets.—Producers are taking orders for delivery in the first quarter at present quotations. New business is of moderate proportions. Specifications against old contracts are equal to shipments and sustain output at 75 per cent of capacity. Jobbers are enjoying an active trade and are ordering freely. Deliveries range from two to three weeks.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.90c. to 3.00c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.15c. to 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Reinforcing Bars.—A substantial amount of new business has been placed and fresh inquiry is more promising than in many weeks. Inquiries for two junior high schools have been revived and prices are being asked on two new similar projects. It is reported that the General Electric Co.'s warehouse, requiring close to 1600 tons, is to be revived. An apartment on Lake Shore Drive, Chicago, will take about 700 tons. Advances in prices appear to be nearer at hand. Consideration is being given by some sellers to a 2.35c. a lb. minimum on carlot orders of billet steel reinforcing bars out of Chicago warehouses. Rail steel reinfor-

cing bars may be advanced to 2.15c. per lb. In the meantime current prices are low and many quotations at the low levels are in the hands of buyers.

Cold-Rolled Strip.—Forward buying remains active at 2.85c. to 2.95c. per lb., Cleveland. Many purchasers, including manufacturers of automobiles, are showing interest in first quarter requirements. Current specifications from most sources are in good volume.

Hot-Rolled Strip.—Western producers have opened first quarter books at the prevailing price, which is 2c. per lb., Chicago, for 6 in. and wider. Users are slow in making forward commitments, but inquiry is in fair volume from a wide circle of consumers. Specifications have fallen measurably in recent weeks.

Wire Products.—Wire mills are carrying lower stocks than is customary at this time of the year and do not now plan to increase production against an anticipated spring demand, preference being given to meeting the spring trade by greater production at that time. Books have not been opened for first quarter. There is some talk of an advance in prices, but conditions point to unchanged quotations for the first quarter. The manufacturing trade in Detroit is quiet, but in other sections of the country it is well sustained. Jobbers in the Southeast are finding business dull, while orders from the Central West, South and Northwest are numerous, but for immediate requirements. After dragging for several weeks, following the announcement of spring terms, there is a decided increase in demand for woven wire fencing and steel fence posts. The nail market is dull and without feature.

Coke.—Only moderate interest is being shown by users in first half contracts. Prices for the new year have been named at \$8 a ton, f.o.b. local ovens, and \$8.75, delivered in the Chicago switching district. Shipments of by-product foundry coke are heavy.

Old Material.—Large consumer withdrawal from the market appears not to have disturbed the price structure to any marked degree. Brokers are anxious to cover old contracts, and shipments to consumers are active

and are subject to stricter inspection than prevailed earlier in the fall. Country scrap, released by higher prices at points of consumption, is flowing in freely, but in some cases it does not meet specifications. Consumption of scrap remains at a high level. Distress tonnage, notwithstanding a greater number of rejections, is readily placed in other directions.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:

Heavy melting steel.....	\$14.50 to \$15.00
Shoveling steel.....	14.50 to 15.00
Frogs, switches and guards, cut apart, and misc. rails	15.75 to 16.25
Hydraul. compressed sheets	13.00 to 13.50
Drop forge flashings.....	10.50 to 11.00
Forg'd, cast and r'l'd steel carwheels.....	17.75 to 18.25
Railr'd tires, charg. box size.....	17.50 to 18.00
Railr'd leaf spring cut apart.....	17.50 to 18.00

Acid Open-Hearth Grades:

Steel couplers and knuckles	16.00 to 16.50
Coil springs.....	18.25 to 18.75

Electric Furnace Grades:

Axle turnings.....	14.25 to 14.75
Low phos. punchings.....	16.50 to 17.00
Low phos. plate, 12 in. and under.....	16.00 to 16.50

Blast Furnace Grades:

Axle turnings.....	12.00 to 12.50
Cast iron borings.....	11.75 to 12.25
Short shoveling turnings..	11.75 to 12.25
Machine shop turnings....	8.00 to 8.50

Rolling Mill Grades:

Iron rails.....	15.00 to 15.50
Rerolling rails.....	16.50 to 17.00

Cupola Grades:

Steel rails less than 3 ft..	17.00 to 17.50
Angle bars, steel.....	16.00 to 16.50
Cast iron carwheels.....	14.25 to 14.50

Malleable Grades:

Railroad.....	16.00 to 16.50
Agricultural.....	12.50 to 13.00

Miscellaneous:

*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:

Iron angles and splice bars	14.50 to 15.00
Iron arch bars and transoms.....	20.50 to 21.00
Iron car axles.....	26.50 to 27.00
Steel car axles.....	15.50 to 16.00
No. 1 railroad wrought...	13.25 to 13.75
No. 2 railroad wrought...	13.00 to 13.50
No. 1 busheling.....	11.50 to 12.00
No. 2 busheling.....	6.00 to 6.50
Locomotive tires, smooth..	13.25 to 13.75
Pipes and flues.....	9.50 to 10.00

Cupola Grades:

No. 1 machinery cast.....	15.50 to 16.00
No. 1 railroad cast.....	15.00 to 15.50
No. 1 agricultural cast....	14.50 to 15.00
Stove plate.....	12.00 to 12.50
Grate bars.....	12.50 to 13.00
Brake shoes.....	11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

Base per Lb.

Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.10c. to 2.50c.
Reinforc'g bars, rail steel.....	1.85c. to 2.40c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands.....	3.65c.
Hoops.....	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	3.60c.
Rivets, boiler.....	3.60c.

Per Cent Off List

Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank..	60
Hot-pressed nuts, hex., tap. or blank..	60
No. 8 black ann'l'd wire, per 100 lb..	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg.....	3.10

Union Wage Rates Slightly Higher

Average wage rates for union labor in 1928, on the basis of 750,000 workers surveyed, are reported by the United States Bureau of Labor Statistics at \$1.159 an hour. This shows a fractional increase over the \$1.154 an hour reported for 1927 for the same group. At the same time, however, there was a slight decline in the weekly full-time wage, because the reduction in average full-time hours in a week was greater than the increase in hourly rates. The average per week

for last year was given as 44.9 hr.

Index numbers show the hourly wages at 260.6 in 1928, compared with 259.5 in 1927, on the basis of 100 as the average of 1913. These two figures are much the highest for any years in our history. Full-time hours to the week, however, were 91.9 in 1928, against 92.4 in 1927, both based on 100 in 1913. These were the smallest figures ever recorded. Wages on the full-time weekly basis were 240.6 in 1928, against 240.8 in 1927. While there was a reduction from last year, the two figures are both considerably above the highest ever before reached.

Philadelphia

First Quarter Contracting for Steel Not Yet Commenced— Shipbuilders Bidding on More Tonnage

PHILADELPHIA, Nov. 27.—Consumers of steel are beginning to show interest in first quarter requirements of plates, shapes, bars and sheets, but no formal inquiries of consequence are in the market. Mills are asking 2c., Pittsburgh, on bars and 2.15c., Coatesville, on plates, but the actual price level for first quarter contracts has not yet been established by transactions. As current contracts are at 1.90c. to 1.95c., Pittsburgh, on bars and 2.05c. and 2.10c., Coatesville, on plates, a \$1 a ton advance to the consumer is considered as the probable level of prices by some sellers.

Fabricators are well occupied, and shipbuilders are bidding on a substantial tonnage of shipping, including ships for the Matson and Ward lines. The city of Philadelphia has awarded a dredge and completion of a pilot boat to the Kensington Shipbuilding & Drydock Co. Local radio manufacturers are fully engaged, and the Philadelphia Storage Battery Co. has just acquired additional property for expansion of output.

Pig Iron.—About 20,000 tons of basic, which has been in the market for several weeks, has been bought by an eastern Pennsylvania consumer at \$19.50 per ton, f.o.b. furnace. Contracting for first quarter foundry iron is still confined to small tonnages, many consumers evidently estimating present commitments to be sufficient for requirements well into the middle of the quarter. Among current inquiries is one for 1000 to 1500 tons of floor iron for the Baldwin Locomotive Works, Eddystone, Pa., and tonnages for the Lansdale, Pa., and Dundalk, Md., plants of the Central Foundry Co. Low phosphorus continues inactive except for small lot purchases. Virginia iron has been advanced 25c. per ton to a basis of \$20.25, furnace, reflecting the recent increase of a like amount in the first quarter price of Birmingham iron.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$21.26 to \$21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X.	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.00
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'rg low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	24.79
Va. No. 2X, 2.25 to 2.75 sil.	25.29

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Ferromanganese.—Most of the large consumers have covered their requirements for next year with domestic producers, British sellers having booked only some of the smaller tonnages. Contracts for first half and the entire year are at \$105 per ton, seaboard.

Bars.—Contracting for the next quarter has not yet begun, but on recent requests for quotations mills have asked 2c., Pittsburgh, or 2.32c., Philadelphia. A substantial tonnage of bars will be required in a number

of small reinforced concrete projects, upon which bids are being taken.

Shapes.—Mills report a fair tonnage of shapes moving from their stocks and are seeking to maintain a minimum of 2.05c. per lb., f.o.b. nearest mill to consumer. While this is being quoted on most of the current purchases, large projects apparently bring out substantial concessions. On a recent contract for a 2700-ton manufacturing building in Philadelphia, a mill price of 1.83c. per lb., delivered, is reported to have been quoted on the shapes. Shipbuilding contracts should provide eastern Pennsylvania mills with some substantial tonnage. The New York Shipbuilding Corporation, Camden, N. J., has been asking prices on about 4000 tons of shapes for vessels on which it is bidding.

Plates.—Shipbuilders are contributing a considerable volume of activity to the market in securing prices on plates to use in bidding for ship construction contracts, among which are one to four vessels for the Matson Lines, one ship for the Ward Line and new bids to be submitted at a later date on four ships for the Export Steamship Corporation. The Sun Shipbuilding Co., Chester, Pa., has taken a contract for a 10,000-ton vessel for the American South African Line, Inc., and the New York Shipbuilding Corporation is asking for 12,000 tons of ship plates. The city of Philadelphia has awarded a \$50,000 dredge and completion of a pilot boat to the Kensington Shipbuilding &

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ½-in. and heavier	2.70c.
Plates, ¾-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats	3.95c.
Steel hoops	3.60c.
Steel bands, No. 12 to ¾-in., inclus.	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue ann'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¾-in.	5.30c.
1-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Drydock Corporation. Plate prices are unchanged at 2.05c. to 2.15c., Coatesville, on current business, with the higher price asked on contracts for the next quarter.

Sheets and Strips.—New business is small, but shipments on current contracts continue heavy, and prices show considerable firmness, with blue annealed at 2.10c., Pittsburgh, or 2.42c., Philadelphia; black at 2.85c., Pittsburgh, or 3.17c., Philadelphia, and galvanized at 3.60c., Pittsburgh, or 3.92c., Philadelphia. Local sheet consumers are maintaining a high rate of operation, and contracting for the next quarter is expected before long. Hot-rolled strip steel shows a tendency to weakness on the basis of recent quotations. An automotive buyer in this district claims that on a recent inquiry for about a carload of hot-rolled strip steel the quotations were on bases of 1.70c., 1.80c., 1.90c. and 2c. per lb., Pittsburgh. The Pennsylvania Railroad opened bids Nov. 27 on 700 tons of blue annealed, black and galvanized sheets for first quarter.

Imports.—In the week ended Nov. 24, 2985 tons of pig iron arrived at this port from British India. Ore imports were confined to 4729 tons of manganese ore from British West Africa. In ferroalloys, 370 tons of spiegeleisen and 30 tons of ferromanganese were received from the United Kingdom. Steel arrivals consisted of 71 tons of steel bars from Germany and 66 tons of steel bars, 150 tons of strip steel and 133 tons of structural shapes from Belgium.

Old Material.—Activity in all grades of iron and steel scrap is almost entirely in shipments to consumers in fulfillment of old contracts. In the absence of actual transactions, prices are difficult to determine, except on the basis of quotations which brokers are willing to make on mill requirements. Yard grade of heavy melting steel is quoted at \$12.25 to \$12.50 per ton, delivered, with shipments going to Pottsville and Phoenixville, Pa. Other grades are unchanged.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$15.50 to \$16.00
Scrap T rails	15.00 to 15.50
No. 2 heavy melting steel	12.25 to 12.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.00
Machine shop turnings (for steel works)	11.00 to 11.25
Heavy axle turnings (or equiv.)	12.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	16.00
Railroad grate bars	12.50
Stove plate (for steel works)	12.50
No. 1 low phos., hvy., 0.04% and under	19.00 to 20.00
Couplers and knuckles	17.50 to 18.00
Roller steel wheels	17.00 to 17.50
No. 1 blast f'nace scrap	10.00 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 20.00
Steel axles	21.50 to 22.00
No. 1 forge fire	12.00 to 12.50
Cast iron carwheels	16.50
No. 1 cast	16.25 to 16.75
Cast borings (for chem. plant)	15.00
Steel rails for rolling	16.50 to 17.00

Cleveland

Steel Bar Prices of 1.90c. to 2c. Named by One Mill for First Quarter—Concessions on Hot-Rolled Strip

CLEVELAND, Nov. 27.—The gain in steel specifications noted a week ago has held up the past week, and November will make a better showing than was expected early in the month. The aggregate tonnage will probably be nearly that entered during October.

The first announcement of a steel bar price for the first quarter has come from an independent steel company, which is naming 1.90c., Pittsburgh, for consumers who use 1000 tons during the quarter and 2c. for smaller consumers. This indicates that there will be no price advance on steel bars for the coming quarter for large-lot buyers, as large consumers placed contracts for the current quarter at 1.90c. The 2c. price compares with a current market price of 1.95c., Pittsburgh, although a minimum amount of small-lot business is being taken at 2c.

When using Cleveland as a basing point, a Youngstown company is asking 1.95c. to 2.05c. for steel bars for the first quarter. The Cleveland mill steel bar price for current orders is 1.90c., mill. Other mills have not yet named first quarter prices on steel bars or on plates and structural shapes.

The only other interesting development in the price situation is a \$2 a ton concession to large buyers from the regular bases for hot-rolled strip, making 1.90c., Pittsburgh, the price for 6-in. and narrower material and 1.80c. for wider than 6 in. to large consumers. Some contracts have been closed at these prices.

The improved demand for steel appears to be due largely to increased activity on the part of the automotive industry, which is releasing specifications for steel and parts for new models to be brought out Jan. 1. Considerable first quarter inquiry is coming from the automobile manufacturers for sheets and strip steel and some have placed contracts.

Plates and structural material are quoted at 1.95c., Pittsburgh, for current orders. The demand for plates is only fair, but structural shapes are moving well to manufacturing plants. Structural awards include 3000 tons placed by the Cleveland Union Terminals Co. and 14,000 tons for railway and highway bridges, the latter taken by an Ohio fabricator. The Great Lakes Engineering Works, Detroit, has taken Lake vessel repair work requiring 1200 tons of plates. New structural inquiry is quiet.

While rail steel reinforcing bars were advanced recently, rerolling mills are still quoting rail steel bars and angles for manufacturing industries at 1.80c., mill.

Pig Iron.—The market still shows a great deal of activity. Prices are firm and unchanged. Cleveland interests sold 46,000 tons in foundry and malleable grades during the week, foundry having been much more active than malleable. While the business was well distributed, jobbing foundries showed more activity during the week than the automotive industry. One Cleveland interest that is well sold up for the first quarter is taking business only for the first half and made several round-lot sales for

that delivery the past week. Another Cleveland producer has opened its books for the second quarter only, having no iron to offer for the first quarter. Other producers are not taking business beyond the first quarter. The local price of \$18.50, furnace, for outside shipment is bringing out considerable business in Ohio, although a Valley producer with an \$18 price is making quite a few sales in the competitive territory in northern Ohio. One Lake furnace is holding to \$19.50 in western Ohio and portions of Indiana. In Michigan the market is unchanged at \$20, furnace. Following a \$2 a ton price advance on Ohio silvery iron by one producer, another maker has marked its price up, but only \$1 a ton, or to \$26 for 8 per cent.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$19.50
S'th'n fdy., sil. 1.75 to 2.25	22.50
Malleable	19.50
Ohio silvery, 8 per cent.	\$29.00 to 30.00
Basic Valley furnace	17.50 to 18.00
Stand. low phos., V'ley fur.	26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Fluorspar.—Producers have opened their books for gravel fluorspar for 1929 at the present price of \$18, mines. While they would prefer to make contracts only for the first half, they will not decline to make commitments for the full year. Consumers are showing some interest in contracts. One Ohio steel maker is inquiring for 3500 tons.

Coke.—New demand for foundry coke is light. Specifications on contracts are good. The demand for by-product coke for domestic use, which has been dragging, is being stimulated by the cooler weather. Ohio by-

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.50c.
Galvanized sheets (No. 24)	4.35c.
Blue ann'l'd sheets (No. 10)	3.45c.
No. 9 ann'l'd wire, per 100 lb.	\$2.85
No. 9 gal. wire, per 100 lb.	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

product foundry coke is quoted at \$7.75, Painesville, for December shipment. Connellsville foundry coke is unchanged at \$3.75 to \$4.85 per net ton, ovens.

Sheets.—Considerable business in auto body sheets for the first quarter has been taken at the new 4.10c. price, and some specifications have already been released for January shipment. A few contracts for other grades have also been taken for the first quarter at the advance, but hardly enough to establish definitely the higher prices. Some first quarter business has been taken in enameling stock at 3.90c., Pittsburgh, this grade not having been advanced. Consumers are still able to place sheet tonnage for December shipment at the old prices. Some early shipment orders are coming from the barrel manufacturers.

Semi-Finished Steel.—Specifications continue to come out in heavy volume. A local mill reports one sale of sheet bars, a 6000-ton lot, for the first quarter at \$34, Cleveland. This producer is asking the same price for large billets and slabs, although Valley mills are on a \$33 basis.

Cold-Finished Steel Bars.—Specifications against contracts increased considerably the past week, and there is a fair volume of new business. The improvement in the demand is due to the placing of orders by some of the automobile companies for parts for new models. A price advance for the first quarter is still doubtful. Makers have set Dec. 10 as the last day for specifications on last quarter contracts.

Wire Products.—Nails are moving slowly, as jobbers have good stocks. Price irregularities are still in evidence in some sections. Nails are firm.

Warehouse Business.—A \$2 a ton price advance on sheets, effective Dec. 1, is announced by a local jobber, and others will probably fall in line. This follows the recent advance in mill prices. The demand for most warehouse products has slowed down.

Strip Steel.—While some business in hot-rolled strip has been taken for the first quarter at the regular base prices, some of the mills have shaded this \$2 a ton to large buyers, or to 1.80c., Pittsburgh, for material wider than 6 in., and it is intimated the large-lot buyers can secure a \$2 concession or 1.90c. on narrow strip. Quite a few first quarter contracts for cold-rolled strip have been taken at the 2.85c., Cleveland and Pittsburgh, price. For small lots, mills are getting 2.95c. Specifications continue to come out in fairly good volume.

Reinforcing Bars.—New inquiry is light. On billet steel bars, 1.85c., Cleveland, appears to be the commonly recognized mill price. Jobbers are asking 2.25c., Pittsburgh, for small lots, but the mill competition is preventing them from getting much busi-

ness at that price. Rail steel bars are quoted at 1.95c. mill.

Old Material.—The market is less active than during the past few weeks. While scrap is coming out somewhat more freely than recently at the quoted prices, no weakness has developed. Some of the mills are restricting shipments, and dealers appear able to buy at quoted prices all the scrap they want to fill outstanding orders. No new consumer demand has appeared. Dealers are paying \$15.75 to \$15.80 for high grade No. 1 heavy melting steel against contracts placed recently by one Cleveland mill. No. 1 busheling scrap, which goes mostly to the Valley district, has declined 50c. more a ton. December scrap lists from Michigan automobile companies show considerable less tonnage than a month ago. The largest list, which was for 2500 tons from the Buick plant, was closed late in the week.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.	\$14.50 to	\$15.00
No. 2 heavy melting steel.	14.00 to	14.50
Compressed sheet steel.	14.00 to	14.50
Light bundled sheet		
stamp'gs	12.00 to	12.50
Drop forge flashings.	12.25 to	12.75
Machine shop turnings.	9.50 to	10.00
No. 1 railroad wrought.	12.75 to	13.00
No. 2 railroad wrought.	14.50 to	15.00
No. 1 busheling.	12.25 to	12.50
Pipes and flues.	9.00 to	9.50
Steel axle turnings.	12.50 to	13.00
Acid Open-Hearth Grades		
Low phos. forging crops.	16.00 to	16.50
Low phos., billet, bloom		
and slab crops.	17.00 to	17.50
Low phos. sheet bar crops.	16.50 to	17.00
Low phos. plate scrap.	15.50 to	16.00
Blast Furnace Grades		
Cast iron borings.	11.00 to	11.50
Mixed bor'gs and short		
turn'gs	11.00 to	11.50
No. 2 busheling.	11.00 to	11.50
Cupola Grades		
No. 1 cast.	16.50 to	17.00
Railroad grate bars.	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.	16.75 to	17.25
Miscellaneous		
Railroad malleable	16.00 to	16.50
Rails for rolling.	16.25 to	16.50

New York

Large Pig Iron Sales at Lower Prices—26,500 Tons of Steel Awarded for Bridge

NEW YORK, Nov. 27.—Pig iron sales for the week were large, totaling more than 17,000 tons. Greater interest is being manifested in first quarter iron, particularly by larger melters. Buying, however, is not so general as several weeks ago, and prices are less buoyant. Buffalo foundry iron now ranges from \$17.50 to \$18, furnace, for No. 2 plain, and on the same grade from eastern Pennsylvania for delivery in this section as low as \$19.50, furnace, has been done, although some producers are still asking \$20.50. The removal of the anti-dumping order against German pig iron is without immediate significance. Apparently, no early revival of imports from Germany is in prospect. The leading importer of Indian pig iron has virtually completed sales against shipments that will get under way before Jan. 1, when an increase in ocean freight rates goes into effect. Among current inquiries is one for 2000 tons of high silicon foundry iron from the Eagle Iron & Brass Foundry Co., Passaic, N. J., for first quarter delivery. The Central Foundry Co., New York, has closed for 600 tons of foundry for its Lansdale, Pa., plant and is still in the market for 4000 to 5000 tons for its Dundalk, Md., works.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil.	1.75
to 2.25	\$22.41 to \$22.91
*Buf. No. 2, del'd east.	
N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil.	
1.75 to 2.25	20.89 to 22.52
East. Pa. No. 2X fdy., sil.	
2.25 to 2.75	21.39 to 23.02
East. Pa. No. 1X fdy., sil.	
2.75 to 3.25	21.89 to 23.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Reinforcing Bars.—General contractors' bids on the Davis loft building in Manhattan, calling for 1000 tons of reinforcing steel, will be opened on Dec. 14. The 8500 tons of bars required for the Delaware, Lackawanna & Western terminal warehouse in Jersey City is expected to be placed this week, and Patrick McGovern, Inc., is expected to take action soon on the steel for the water tunnel in Manhattan and Brooklyn, on which it is general contractor. This calls for 2850 tons of bars. The largest award reported recently was a power house near Amenia, N. Y., taking 660 tons, which went to the Concrete Steel Co. The volume of small orders has kept up at a fairly good rate during the month and indications point to considerable activity during December. Prices are strong at the levels quoted last week.

Bars, Shapes and Plates.—Some of the mills will not formally open their books for first quarter until next week. Meanwhile, a few contracts for bars have been entered, including one of 1800 tons, at the prices which the buyers covered for the fourth quarter. A maker of plates in the East has informed a few customers who have inquired that its fourth quarter price tentatively is 2.15c., Coatesville base, but this is subject to revision if, as now seems probable, most of the mills extend the fourth quarter prices into the first quarter. Many of the large buyers of bars are protected for this quarter at 1.90c., Pittsburgh, with 2.05c., Eastern mills, applying on plate and shape contracts for this quarter. Bids will be closed on Dec. 6 by the North New Jersey District Water Supply Commission

for the Wanaque waterline from the Delaware River to Newark, requiring 38,000 tons of plates for fabricated pipe. The outstanding structural award of the week was the Kill von Kull bridge from Staten Island to New Jersey, which will take 26,500 tons of steel. The American Bridge Co. was the low bidder and will get

Warehouse Prices, f.o.b. New York

Base per Lb.	
Plates and structural shapes.	3.30c.
Soft steel bars, small shapes.	3.25c.
Iron bars, Swed. charcoal.	3.24c.
Iron bars, Swed. charcoal.	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.	3.50c.
Flats and squares.	4.00c.
Cold-roll. strip, soft and quarter	
hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'd sheets (No. 10)	3.85c. to 3.90c.
Long terme sheets (No. 24)	5.60c. to 5.80c.
Standard tool steel.	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger.	3.30c.
Smooth finish, 1 to 2½ x ¼ in.	
and larger	3.65c.
Open-hearth spring steel, bases,	
4.50c. to 7.00c.	
Per Cent Off List	
Machine bolts, cut thread:	
¾ x 6 in. and smaller.	.60
1 x 30 in. and smaller.	.50 to 50 and 10
Carriage bolts, cut thread:	
¾ x 6 in. and smaller.	.60
¾ x 20 in. and smaller.	.50 to 50 and 10
Coach screws:	
¾ x 6 in. and smaller.	.60
1 x 16 in. and smaller.	.50 to 50 and 10
Boller Tubes—	
Lap welded, 2-in.	\$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
¾-in. butt.	46	29
¾-in. butt.	51	37
1-3-in. butt.	53	39
2½-6-in. lap.	48	35
7 and 8-in. lap.	44	17
11 and 12-in. lap.	37	12
Wrought Iron—		
¾-in. butt.	5	+19
¾-in. butt.	11	+9
1-1½-in. butt.	14	+6
2-in. lap.	5	+14
3-6-in. lap.	11	+6
7-12-in. lap.	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box.	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.	\$10.00 to \$11.00
IC—30-lb. coating.	12.00 to 13.00
IC—40-lb. coating.	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

One Pass		Per Lb.
Nos. 18 to 20.	3.60c. to 3.80c.	
No. 22.	3.75c. to 3.95c.	
No. 24.	3.80c. to 4.00c.	
No. 26.	3.90c. to 4.10c.	
No. 28*	4.05c. to 4.25c.	
No. 30.	4.30c. to 4.50c.	

Sheets, Galvanized

		Per Lb.
No. 14.	4.15c. to 4.35c.	
No. 16.	4.00c. to 4.20c.	
No. 18.	4.15c. to 4.35c.	
No. 20.	4.30c. to 4.50c.	
No. 22.	4.35c. to 4.55c.	
No. 24.	4.50c. to 4.70c.	
No. 26.	4.75c. to 4.95c.	
No. 28*	5.00c. to 5.20c.	
No. 30.	5.40c. to 5.60c.	

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

the job, subject to the approval of the Governors of New York and New Jersey.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.34c.; plates, 2.22½c. to 2.27½c.; struc. shapes, 2.19½c. to 2.22½c.; bar iron, 2.14c. to 2.24c.

Sheets.—Contracting for the first quarter has progressed during the past week, many consumers having closed for their requirements somewhat further ahead of the opening of a new quarter than has been their practice previously this year. Contracts have been made at the new prices, which represent a \$2 advance, but some mills are still making current sales for immediate specification and for shipment before the end of the year at the former prices.

Warehouse Business.—Jobbers' quotations on sheets are showing more firmness, but small concessions are still obtainable in the New York district. Despite the advanced season, some substantial orders for structural shapes are being placed with warehouses. Business in November has been good, but less than in October, which was the best month of the year for most jobbers.

Cast Iron Pipe.—Quotations of Northern makers of pressure pipe continue strong and the market today is quotable at \$38.60 to \$39.60 per net ton, delivered New York. Inquiries for spring delivery of gas pipe are accumulating and some substantial buying is expected from privately owned gas companies before the end of the year. An inquiry for about 15,000 tons of gas pipe for a large utility company is not yet reported closed. The Brooklyn Union Gas Co., Brooklyn, is inquiring for about 500 tons of large size pipe. Two recent inquiries for water pipe to be exported to South American markets brought out low bids from Continental makers. On about 1500 tons of pipe for shipment to South America, inquired for by the Foundation Co., New York, the Pont-a-Mousson works in France is understood to have been the low bidder, and on 396 tons of 4 to 12-in. pipe for Peru, inquired for by W. R. Grace & Co., New York, the Gelsenkirchen Bergwerks A. G., in Germany, is reported to have submitted the lowest bid on thin-walled centrifugal pipe.

Prices per net ton, deliv'd New York: Water pipe, 6-in. and larger, \$38.60 to \$39.60; 4-in. and 5-in., \$43.60 to \$44.60; 3-in., \$53.60 to \$54.60; Class A and gas pipe, \$4 to \$5 extra.

Coke.—Furnace coke prices continue to show greater firmness, but are unchanged at \$2.85 to \$3.05 per net ton, Connellsville. The foundry coke market is moderately active, and prices range from \$3.50 to \$3.75 per ton, Connellsville. Special brands of foundry coke are quoted at \$4.85 per net ton, ovens, or \$8.56, delivered to northern New Jersey, Jersey City and Newark and \$9.44 to New York or Brooklyn. Consumers of by-product foundry coke from the local producer and the New England interest are under contract for first quarter and first half of next year, but the West Vir-

ginia company, which sells into this district, has not opened its books for the coming year. By-product foundry coke prices are unchanged at \$9 to \$9.40, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Old Material.—Prices of all grades of scrap are unchanged, except for a slightly lower level of buying prices on machine shop turnings, \$11 per ton, delivered eastern Pennsylvania, being the present maximum offer. Blast furnace scrap is being shipped to Bethlehem, Pa., at \$9.50 per ton, delivered, and to Swedeland, Steelton and Coatesville, Pa., at \$10.50 per ton, delivered. Some small tonnages of yard grade of heavy melting steel are moving to consumers at Phoenixville, Pottsville and Conshohocken, Pa., to complete old contracts.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$11.75 to \$12.00
Heavy melting steel (yard)	8.25 to 8.50
No. 1 hvy. breakable cast	11.25 to 11.75
Stove plate (steel works)	8.50
Locomotive grate bars	8.50
Machine shop turnings	7.25 to 7.50
Short shoveling turnings	7.25 to 7.50
Cast borings (blast furn. or steel works)	6.75 to 7.00
Mixed borings and turnings	6.75 to 7.00
Steel car axles	17.50 to 18.00
Iron car axles	25.25 to 26.25
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	8.00 to 8.50
No. 1 railroad wrought	12.25 to 12.75
No. 1 yard wrot., long	11.25 to 11.75
Rails for rolling	13.00 to 13.50
Cast iron carwheels	12.00 to 12.50
Stove plate (foundry)	8.50
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.25
Prices per gross ton, deliv'd local foundries:	
No. 1 machry. cast	\$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Coal Carbonization Plant for Lukens Company

The International Combustion Engineering Corporation, New York, has closed a contract with the Lukens Steel Co., Coatesville, Pa., which provides for the building of a low temperature coal carbonization plant at Coatesville. It will be the first low temperature coal carbonization plant identified with the steel industry and the second installation in America. Ground will be broken for the Coatesville installation the first of the year and the plant is expected to be in operation early in 1930.

The new plant will be owned and operated by the International Coal Carbonization Co., a subsidiary of the International corporation, which will sell the gas to the Lukens company under a long term contract. Approximately 1,750,000 cu. ft. of gas will be produced daily. This is a high quality gas which will be used for the heat treating of steel throughout the Lukens plant and will replace raw producer gas now used for this purpose. In addition to the gas derived from the new process other valuable constituents of the coal are recovered, consisting of a high quality tar, light oils, a superior grade of anti-knock motor fuel and a high grade domestic

fuel, which will be sold locally. The initial installation will comprise six retorts and will be capable of carbonizing 500 tons of high volatile bituminous coal per day. The daily coke yield available for domestic use will average from 300 to 325 tons. The ultimate plant is designed for double this capacity.

Massillon Hammers Bought by Industrial Brownhoist

Industrial Brownhoist Corporation, Cleveland, announces the purchase of the complete line of Massillon hammers, formerly manufactured and sold by the Massillon Foundry & Machine Co. Production of Massillon single-frame and double-frame forging hammers, steam drop and board drop hammers, as well as trimming presses and bar shears, is now going forward at the Cleveland plant of the corporation. W. J. Cadman, who has been connected with the Massillon organization for many years, will be in charge of the new hammer department for Industrial Brownhoist and will be located in Cleveland.

Machinery Industries to Meet Again Feb. 14

WASHINGTON, Nov. 27.—Notices have been sent out to members of machinery and equipment associations by Philip P. Gott, secretary of the Machinery and Equipment Conference, stating that the next conference has been set tentatively for Feb. 14 at the United States Chamber of Commerce Building. The announcement listed some of the subjects discussed at previous meetings and asked association members to indicate, in order of importance to their industry, the subjects which should be placed on the program for the February conference. They also were asked to suggest the scope of the survey which should be made and the type of information which should be available for discussion, the purpose being to arrive at plans for solution of problems common to the industry.

Subjects listed as having been discussed informally and which are to be treated for specific action include unfair competitive practices, uneconomic practices, tariff, census schedules and classification, depreciation, obsolescence, uniform cost accounting, statistics, credits and sales terms.

A feature of the seventh National Exposition of Power and Mechanical Engineering, to be held at New York, will be a motion picture program running through the entire week of the show, Dec. 3 to 8. The films include "The Handling of Heat," showing the use of Norton refractories in industry, "The Manufacture of Timken Steel Roller Bearings," and "Conowingo," showing the building of the power plant on the Susquehanna River by the Stone & Webster Engineering Co.

Pacific Coast

Awards of Plates, Structural, Reinforcing Bars and Cast Iron Pipe Feature Western Business

SAN FRANCISCO, Nov. 24 (*By Air Mail*).—Important bookings of iron and steel products this week on the Pacific Coast included 1800 tons of plates for oil storage tanks for the Shell Oil Co., San Francisco, placed with the Western Pipe & Steel Co. and the Steel Tank & Pipe Co.; 1800 tons of reinforcing bars for the Life Science Building at Berkeley, taken by the Pacific Coast Steel Co., and 1600 tons for an apartment building in Los Angeles, booked by the Union Iron Works.

Pig Iron.—Movement of foundry pig iron continues limited to small lots. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	.....\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	.....25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	.....24.00 to 25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—More than 2100 tons of reinforcing bars was placed during the week; the largest lot was 1800 tons for a college building at Berkeley, as mentioned above. New inquiries include 400 tons for a school at Portland, 290 tons for an apartment in Los Angeles and about 400 tons for highway work in California. Out-of-stock material in the San Francisco and Los Angeles districts remains at about 1.80c. base. Several fair-sized lots have gone at as low as 1.70c.

Plates.—The only important award this week in the plate market was 1800 tons for six 82,000 bbl. oil storage tanks for the Shell Oil Co. at Martinez, Cal., the business having been divided between the Steel Tank & Pipe Co. and the Western Pipe & Steel Co. Bids were opened last week on 550 tons of 24-in. riveted pipe for Seattle and alternate bids were taken on cast iron pipe. The city decided to purchase cast iron pipe, placing the general contract with L. Coluccio. Prices continue firm at 2.25c., c.i.f., as a minimum.

Shapes.—Awards of structural material this week were the third heaviest of the year and totaled over 7600 tons. The Southern Pacific Co. placed 1500 tons of bridge work with the American Bridge Co. Other outstanding awards included 425 tons for a saw mill at Longview, Wash., for the Weyerhaeuser Lumber Co., booked by

the Star Iron & Steel Works, and 344 tons for an apartment in Los Angeles, secured by the Llewellyn Iron Works. The Wallace Bridge & Structural Steel Co. obtained an order for a steel barge for Young Brothers, Ltd., at Honolulu, calling for 250 tons of channels. A fair volume of pending business is before the trade, most of which is expected to be placed during the next week or 10 days. Plain material is firm at 2.35c., c.i.f.

Cast Iron Pipe.—New inquiries for cast iron pipe come out slowly, and pending business does not exceed 1000 tons. The feature of the market this week was the award placed with L. Coluccio by the city of Seattle for 1915 tons of 24-in. Classes B to F pipe for a line from Volunteer Park Reservoir to Queen Anne standpipe. This is the second largest order placed dur-

ing the last half of the current year. Aberdeen, Wash., placed 90 tons of 12-in. Class 250 pipe with the American Cast Iron Pipe Co. The only new inquiry of importance this week was for 292 tons of 4 to 8-in. Class C pipe for Friday Harbor, Wash.

Steel Pipe.—An award of 102 tons of $\frac{3}{4}$ to 1-in. galvanized pipe for the city of Los Angeles is expected to be made during the coming week. An inquiry for 800 tons of 6-in. line pipe for a Los Angeles interest is now being figured on. Some improvement in demand for standard steel pipe is reported by distributors in this section.

Coke.—Demand for foundry coke has shown little improvement and reflects the quiet condition in the pig iron market. Foundry operations, especially among the jobbing plants, continue on a limited basis, and most consumers have sufficient stocks in foundry yards to take care of present requirements. English beehive is quoted at \$16 a net ton, delivered incoming dock, and by-product coke at \$11.50 to \$13 a net ton.

St. Louis

Substantial Sales of Pig Iron for First Quarter—All Steel Products, Except Plates, in Good Demand

ST. LOUIS, Nov. 27.—The past week was another good one for makers of pig iron. The St. Louis Gas & Coke Corporation sold 9500 tons, and a leading Southern interest sold 4000 tons, all for first quarter. Sales of the Southern iron were at the new price of \$16.50, Birmingham; the largest lot was 500 tons. The Granite City maker's principal sale was 6000 tons of basic to an East Side melter catering to railroads, which had purchased 5000 tons of basic the preceding week for shipment during November and December. Of the local maker's sales of 3500 tons of foundry grades, the largest lot was 600 tons to an East Side equipment maker; an Illinois manufacturer took 400 tons, and there were four sales of 300 tons each to jobbing foundries in the district, while a northern Illinois home appliance manufacturer bought 350 tons. Business with car builders is increasing, and foundries in the St. Louis trade territory which furnish castings to the Ford Motor Co. have been asked to speed up deliveries. The market is firm, and some melters have offered business at present prices for second quarter delivery, but such offers have been declined.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	.....\$20.00
Granite City, Ill.	.....20.50
Malleable, f.o.b. Granite City	.....22.16
N'th'n No. 2 fdy., deliv'd St. Louis	.....20.92
Southern No. 2 fdy., deliv'd	.....22.16
Northern malleable, deliv'd	.....22.16
Northern basic, deliv'd	.....22.16

Freight rates: 81c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—Colder weather has caused a marked increase in the movement of domestic grades of coke from the by-

product ovens in the district to dealers here and in the trade territory. Local dealers have shown no inclination to accumulate heavy stocks. There has been a heavier consumption of foundry grades in the district. Prices are unchanged.

Finished Iron and Steel.—The Board of Public Service will open bids next week for the third unit of the River Des Peres sewer project, which will require 2000 tons of reinforcing bars; the first unit took about 7000 tons. Structural fabricators report business is dull. The Granite City Steel Co. reports that incoming business so far this month has been equal to that of the same period in October and considerably ahead of that of last November. This applies to all lines except plates, this item being dull, al-

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	..... 3.25c.
Bars, soft steel or iron	..... 3.15c.
Cold-fin. rounds, shafting, screw stock	..... 3.75c.
Black sheets (No. 24)	..... 4.10c.
Galv. sheets (No. 24)	..... 4.95c.
Blue ann'l'd sheets (No. 10)	..... 3.45c.
Black corrug. sheets (No. 24)	..... 4.15c.
Galv. corrug. sheets	..... 5.00c.
Structural rivets	..... 3.75c.
Boiler rivets	..... 3.75c.

Per Cent Off List

Tank rivets, $\frac{7}{8}$ -in. and smaller, 100 lb. or more	..... 65
Less than 100 lb.	..... 60
Machine bolts	..... 60
Carriage bolts	..... 60
Lag screws	..... 60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more	..... 60
Less than 200 lb.	..... 50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more	..... 60
Less than 200 lb.	..... 50

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	..... 3.15c.
Soft steel bars	..... 3.15c.
Small angles, $\frac{3}{8}$ -in. and over	..... 3.15c.
Small angles, under $\frac{3}{8}$ -in.	..... 3.55c.
Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{1}{2}$ -in.	..... 3.75c.
Spring steel, $\frac{3}{4}$ -in. and thicker	..... 5.00c.
Black sheets (No. 24)	..... 5.00c.
Blue ann'l'd sheets (No. 10)	..... 4.00c.
Galv. sheets (No. 24)	..... 5.40c.
Struc. rivets, $\frac{3}{4}$ -in. and larger	..... 5.65c.
Com. wire nails, base per keg	..... \$3.40
Cement c'd nails, 100 lb. keg	..... 3.40

though it is expected to show some life as the result of prospective car business. Warehouse business is beginning to feel the effects of the pre-inventory lull, everyone bending their efforts to keep down stocks of raw materials.

Old Material.—Consumers of old material and dealers in the St. Louis industrial district are still at variance on the question of price. Several of the larger mills have indicated their willingness to buy at prices that prevailed a month ago, but dealers contend for a higher basis. The only price change is on No. 1 railroad wrought, which is 50c. a ton higher. Railroad lists: Chicago, Burlington & Quincy, 5695 tons; Union Pacific, 3100 tons; Big Four, 1350 tons; Frisco Lines, 1000 tons and 12 carloads; Great Northern, 165 carloads; Nickel Plate, 46 carloads; Cotton Belt, 28 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel.....	\$13.25 to \$13.75
No. 2 heavy melting or shoveling steel.....	12.25 to 12.75
No. 1 locomotive tires....	14.50 to 15.00
Miscel. stand-sec. rails including frogs, switches and guards, cut apart....	15.00 to 15.50
Railroad springs.....	16.00 to 16.50
Bundled sheets.....	9.50 to 10.00
No. 2 railroad wrought....	13.25 to 13.75
No. 1 bushing.....	9.50 to 10.00
Cast iron borings.....	8.75 to 9.25
Iron rails.....	13.50 to 14.00
Rails for rolling.....	15.50 to 16.00
Machine shop turnings....	9.00 to 9.50
Steel car axles.....	19.00 to 19.50
Iron car axles.....	27.00 to 27.50
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought....	12.50 to 13.00
Steel rails, less than 3 ft..	17.50 to 18.00
Steel angle bars.....	14.25 to 14.75
Cast iron carwheels.....	14.00 to 14.50
No. 1 machine cast.....	15.50 to 16.00
Railroad malleable.....	15.00 to 15.50
No. 1 railroad cast.....	14.00 to 14.50
Stove plate.....	12.50 to 13.00
Agricult. malleable.....	11.50 to 12.00
Relay. rails, 60 lb. and under.....	20.50 to 23.50
Relay. rails, 70 lb. and over.....	26.50 to 29.00

sure pipe manufacturers are reduced to a low point. Several plants are operating on part time schedules. A few prospective buyers are feeling out the market and makers are hopeful of improved conditions by the end of the year. Prices are firm at \$37 to \$38 on 6-in. and larger sizes.

Coke.—Most of the new business in foundry coke consists of small-lot orders for immediate delivery as first quarter requirements were well covered several weeks ago. Production is a little heavier than last month. Quotations remain at \$5 for both spot and contract.

Old Material.—The improvement in scrap steel rails reported last week has resulted in an advance of 50c. a ton. Tram car wheels have been advanced \$1 a ton, while No. 1 cast and stove plate have dropped 50c. a ton. Other prices are unchanged. New business is spotty. Shipments improved slightly during the past week and are now moving out in fairly satisfactory volume.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.50
Scrap steel rails.....	\$12.00 to 12.50
Short shoveling turnings..	8.00 to 8.50
Cast iron borings.....	8.00
Stove plate.....	13.50
Steel axles.....	19.00 to 20.00
Iron axles.....	21.00 to 22.00
No. 1 railroad wrought....	10.00 to 10.50
Rails for rolling.....	14.00 to 15.00
No. 1 cast.....	15.00
Tramcar wheels.....	13.00 to 14.00
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem....	13.50 to 14.00

Birmingham

Pig Iron Advanced to \$17 By One Producer—Bars, Plates, Shapes and Sheets Higher

BIRMINGHAM, Nov. 27.—The new base of \$16.50 for foundry iron is being well received. One producer has advanced its price to \$17. Makers in the district have accumulated sizable backlogs for the first quarter since the opening of books Nov. 15. There has been a steady day to day buying movement, and several of the larger melters have covered for the quarter. Shipments so far this month have been running about equal to those of October, one of the best months of the year. The No. 2 Bessemer furnace of the Tennessee company, which had been banked since Oct. 7, was blown in Nov. 19 on foundry iron. This company is scheduled to make other changes this week owing to the resumption of operations at its Ensley rail mill. Of the 19 furnaces in blast, 13 are on foundry, four on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil..	\$16.50 to \$17.00
No. 1 fdy., 2.25 to 2.75 sil..	17.00 to 17.50
Basic.....	16.50

Finished Steel.—An advance of \$2 a ton has been made on bars, plates, shapes and sheets following a gradual strengthening of the market during the past several weeks. Sheets are strong at the new prices and mills are holding closely to quotations in other lines. Inquiries continue active in all lines. The Tennessee company has booked additional rail tonnage, including 13,000 tons for the Southern Pacific. The Ensley rail mill of this company was placed in operation again on Nov. 24. Inquiries are good in the structural plate market. Reeves Brothers have booked an order for 1000 tons of tanks for Ingleside, Tex. Structural steel fabricators are operating on better schedules than at any time in recent months. Pending tonnage is favorable. Sixteen open-hearths continue in operation; the

Tennessee company is working seven at Fairfield, five at Ensley and the Gulf States Steel Co. four at Alabama City.

Cast Iron Pipe.—With new tonnage still running light, backlogs of pres-

Boston

More Pig Iron Inquiry for 1929 Developing—Scrap Exports Are Resumed

BOSTON, Nov. 27.—More inquiry for 1929 pig iron is developing. Crompton & Knowles Loom Works, Worcester, Mass., is inquiring for 500 to 1000 tons of No. 2 plain and No. 1X iron, deliveries running into April, and a

Providence, R. I., melter has intimated it will make early inquiry for 1000 tons or more of No. 2X and No. 1X, with possibly some malleable, for delivery running into second quarter. In addition, several smaller melters say they will buy an aggregate of about 3000 tons, mostly No. 2X, within the near future. Sales the past week included 1000 tons No. 2X, first and second quarter delivery, to a western Massachusetts melter, and 1500 tons, mostly No. 1X, to a Connecticut machinery builder. Otherwise, less than 3000 tons was sold. Alabama iron is 25c. a ton higher at \$16.50 a ton, base furnace, with regular 50c. differentials, while eastern Pennsylvania is \$21 a ton, base furnace.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$22.91
*Buffalo, sil. 2.25 to 2.75..	23.41
†Buffalo, sil. 1.75 to 2.25..	21.78
†Buffalo, sil. 2.25 to 2.75..	22.28
East Penn., sil. 1.75 to 2.25..	\$24.15 to 24.65
East Penn., sil. 2.25 to 2.75..	24.65 to 25.15
Va., sil. 1.75 to 2.25.....	26.91
Va., sil. 2.25 to 2.75.....	27.41
Ala., sil. 1.75 to 2.25.....	23.41 to 25.27
Ala., sil. 2.25 to 2.75.....	23.91 to 25.77

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.
*All rail rate. †Rail and water rate.

Imports.—Local imports of pig iron for the first half of November were 1707 tons, consisting of 881 tons of

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates.....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zees.....	3.465c.
Soft steel bars, small shapes....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway rounds.....	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tie steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.55c. to 5.55c.
Squares and flats.....	*4.05c. to 7.05c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
Per Cent Off List	
Machine bolts.....	50 and 5
Carriage bolts.....	50 and 5
Lag screws.....	50 and 5
Hot-pressed nuts.....	50 and 5
Cold-punched nuts.....	50 and 5
Stove bolts.....	70 and 10

*Including quantity differentials.

Indian and 826 tons of Dutch. Boston pig iron interests believe that the revocation of the anti-dumping duty on German pig iron will not attract tonnages here for a time at least.

Fabricated Steel.—With the exception of one of the largest firms, New England fabricators have sufficient business on their books to keep shops operating on present capacities well into 1929. Competition for business among fabricators is still keen, but jobs are being taken at better prices than two months ago. Several good tonnages are hanging over the market and should be closed shortly.

Warehouse Business.—In point of shipments out of stock, November unquestionably will be the best month experienced this year by warehouse interests. Full list prices and extras are now maintained on all iron and steel products, regardless of the size of business involved.

Coke.—The New England Coal & Coke Co. has just shipped 2900 tons domestic coke to Halifax for the British Empire Steel Corporation's wholesale fuel trade, bringing exports there so far this month up to 5800 tons. Owing to rail orders, the Canadian company has had to blow in another furnace, thereby shutting off its wholesale domestic coke supply. New England foundry coke makers are catching up on specifications. One of them is taking first half contracts at a flat rate of \$11 a ton, delivered within a \$3.10 freight rate zone, instead of on a sliding scale.

Old Material.—Scrap exports have been resumed. A boat is loading 3500

tons mixed No. 1 and No. 2 steel, mostly automobile, for which \$10.50 a ton, on dock, is being paid. The cargo will go to Danzig. It is expected another boat will load 3000 tons late in December. Scrap prices for Pennsylvania mill consumption are practically the same as a week ago. The recent decline has dried up offerings, making it more difficult for shippers to fill old contracts. The American Steel & Wire Co., Worcester, has stopped buying, and local brokers report no negotiations with the Mystic Iron Works. Only an occasional sale of machinery cast to New England foundries is reported, but prices are firm. The Navy Yard, Boston, will take bids on 800,000 lb. structural scrap, 350,000 lb. angles, rods, channels and other miscellaneous smaller lots of scrap.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$10.50 to \$11.00
Scrap T rails	10.50 to 11.00
Scrap girder rails	10.00 to 10.25
No. 1 railroad wrought	11.00 to 11.50
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	6.00 to 6.50
Cast iron borings (steel works and rolling mill)	6.00 to 6.50
Bundled skeleton, long	9.00 to 9.25
Forge flashings	9.50 to 9.75
Blast furnace borings and turnings	5.50 to 6.00
Forge scrap	6.00 to 7.00
Shafting	14.50 to 14.75
Steel car axles	16.00 to 16.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.75 to 10.00
Rails for rolling	11.00 to 11.50
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	\$14.00 to \$14.50
No. 1 machinery cast	15.00 to 15.50
No. 2 machinery cast	13.00 to 13.50
Stove plate	11.00 to 11.50
Railroad malleable	15.50 to 15.75

to Boulne & Leonard, Montreal, for hospital at St. Hyacinthe, Que.; 200 tons to Dominion Bridge Co., for power house for the Sun Life Assurance Co., Montreal.

Old Material.—A brisk demand for most grades of iron and steel scrap is reported by Toronto and Montreal dealers. Sales in the week were mostly for spot delivery. Recent inquiry indicates a stronger buying movement in the near future. Prices are unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	\$9.50	\$7.00
Rails, scrap	10.00	9.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron	16.00	22.00
No. 1 machinery cast	15.00	16.00
Stove plate	13.00	13.00
Standard carwheels	16.00	16.00
Malleable	13.00	13.00
	Per Net Ton	
	Toronto	Montreal
No. 1 machinery cast	15.00	15.00
Stove plate	9.00	9.00
Standard carwheels	13.00	13.00
Malleable scrap	13.00	13.00

Youngstown

Steel Output Now at 80 Per Cent

YOUNGSTOWN, Nov. 27.—Steel business reaching makers in this district, although much smaller in volume than it was in October, is considerably heavier than at this time last year. Production now is about 80 per cent against an ingot output a year ago of less than 60 per cent. Bar specifications are running a little heavier than they did at the beginning of the month, but orders and specifications for other finished products of Youngstown district mills are tapering. No fresh pipe line business of consequence has been booked lately, and as this ordinarily is a period of light sales of other classes of pipe into consumption, distributors are not calling as heavily nor as frequently upon the mills as recently for warehouse replenishments. Sheets are doing comparatively well, and there is not much variation in the rate of strip steel specifications.

In the primary materials, conditions are growing easier. Against a price of as much as \$18.50 for heavy melting steel scrap, melters here say they can now buy at \$17.50 and believe that if they really wanted supplies they might get them even for less. The pinch in the local supply of scrap has been pretty well relieved, and, since scrap originating in and around Detroit cannot much longer be safely shipped by water to Cleveland and Buffalo, there is a possibility of increased supplies becoming available for this district and Canton and Massillon. While there have been sales of basic pig iron at \$18, Valley furnace, the situation appears slightly weaker in view of the fact that there

Canada

Building Construction Continues to Feature Dominion Activities—Pig Iron Demand Brisk

TORONTO, ONT., Nov. 27.—Current demand for merchant pig iron is chiefly for spot delivery. While there is still a steady flow of orders ranging from 50 to 200 tons, orders for as much as 500 tons for early shipment have also been placed. Inquiry is appearing for foundry and malleable iron for first quarter delivery, but producers have not yet opened their books for that period. It is expected that there will be some change in prices before books are opened for 1929 delivery iron. Canadian quotations are firm but unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	25.00
No. 2 fdy., sil. 1.75 to 2.25	25.00
Malleable	25.00
Basic	24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—Statistics compiled from 63 cities of the Dominion show estimated building values for 10

months of 1928 at \$187,697,420, a gain of nearly \$28,000,000 over the same period of 1927. This activity has been reflected in a steadily increasing demand for structural steel and reinforcing bars. Numerous projects requiring from 50 to 500 tons of steel are pending, and several contracts being figured will take from 1000 to 10,000 tons each. The National Terminals of Canada, Montreal, will require approximately 2500 tons for a warehouse; 10,958 tons will be used in the new store at Yonge and College Streets, Toronto, Ont., for the T. Eaton Co., a part of which has already been ordered. Contracts placed during the week included 750 tons to McGregor & McIntyre Structural Steel Co., Toronto, for Bayview bridge in North York Township; 100 tons to Frankel Brothers, Toronto, for plant for A. R. Williams Machinery Co., Toronto; 2000 tons to Canadian Bridge Co., Walkerville, Ont., for first unit of plant for Chrysler Corporation of Canada; 1250 tons to Standard Steel Construction Co., Welland, Ont., for hotel at Niagara Falls, Ont.; 500 tons

are now steel company offerings of this grade, as against the condition of a few weeks ago when they were not disposed to sell in the belief that they would need all of their production. A recent sale of a round lot at \$17.50, Valley furnace, for first quarter shipment is testimony that \$18, recently asked, is not to be had in all cases.

No formal announcement has been made as to first quarter prices on bars and small shapes, but there is a growing impression that the present prices will be reaffirmed, which would mean 1.90c., base, to the large buyers and 1.95c. to 2c., base, to those with less attractive business to offer.

All sheet makers here subscribe to

the recently announced first quarter prices and some business for that delivery is being entered at the new prices. Higher prices also are being sought for first quarter tonnages of strips, but it is admitted that not much business yet has been done for that period. It is expected that with the opening of negotiations, the hot-rolled strip price will settle to a single base. The new card of extras adopted early in October was formulated with an idea of applying on all widths up to 24 in. and to get away from a triple base, which resulted in no end of confusion and unsettlement in prices. The idea of most makers is a base of 2c., adding the new extras.

the latter figure for small tonnages. Bars, shapes and plates are steady at 1.95c. to 2c., base Pittsburgh.

Coke.—Shipments of by-product foundry coke are running approximately 25 per cent less than in October, and further curtailment in specifications is anticipated as the inventory period approaches. Demand for domestic grades has been about normal for this season. Prices of by-product foundry and of beehive foundry from the New River and Wise County districts are unchanged.

Old Material.—There has been a fair demand from scrap users, and district steel plants are taking their usual commitments on current contracts. Prices are moderately firm, with weaknesses cropping out in certain items, notably cast iron borings, machine shop turnings, No. 1 busheling, railroad and agricultural malleable.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$13.00 to \$13.50
Scrap rails for melting.....	13.25 to 13.75
Loose sheet clippings.....	9.50 to 10.00
Bundled sheets.....	10.25 to 10.75
Cast iron borings.....	9.00 to 9.50
Machine shop turnings.....	8.50 to 9.00
No. 1 busheling.....	10.75 to 11.25
No. 2 busheling.....	6.25 to 6.75
Rails for rolling.....	14.00 to 14.50
No. 1 locomotive tires.....	14.00 to 14.50
No. 2 railroad wrought.....	13.00 to 13.50
Short rails.....	19.00 to 19.50
Cast iron carwheels.....	12.50 to 13.00
No. 1 machinery cast.....	18.50 to 19.00
No. 1 railroad cast.....	14.75 to 15.25
Burnt cast.....	10.50 to 11.00
Stove plate.....	10.50 to 11.00
Brake shoes.....	10.25 to 10.75
Railroad malleable.....	13.75 to 14.25
Agricultural malleable.....	12.75 to 13.25

Cincinnati

Alabama Pig Iron Advanced by One Producer to \$17—Sheet Mills of District Hold High Operating Rate

CINCINNATI, Nov. 27.—Sales of almost 31,000 tons and a further upward movement of prices have contributed additional strength to the pig iron market. First quarter buying has been of fairly good proportions, largely on account of the desire of consumers to protect themselves against higher prices, and in a few instances iron for second quarter delivery has been sold. Closely following the recent advance of 25c. a ton on Southern iron has come the announcement by an Alabama producer of a further increase of 50c. to \$17, base Birmingham. While other makers in the South have not formally abandoned their schedule of \$16.50, it is understood that within a day or two all furnace interests will be quoting on the basis of \$17. Incidentally, considerable Southern iron has been sold in the district bordering and adjacent to the Ohio River as a result of the stiffening of prices, most customers having been given opportunity to cover their needs prior to the advance. With northern Ohio sellers maintaining \$18.50, base furnace, and with the Southern iron trend sharply upward, Valley iron has penetrated western Ohio and eastern Indiana and a number of orders were booked at \$18, Valley furnace. Of interest to users of silvery iron is the fact that a discrepancy has appeared in the new schedules of the two Jackson County makers. One furnace has increased its price \$1 a ton on all grades of silvery iron and Bessemer ferrosilicon, whereas the other producer has advanced quotations \$2 a ton. This difference gives a range of from \$26 to \$27, base furnace, on 8 per cent. Southern Ohio foundry iron remains nominally at \$18.50, base Ironton. Sales in the past week included 2500 tons to the Marmon Motor Car Co., Indianapolis, and 3500 tons to another central Indiana melter. The Favorite Stove & Range Co., Piqua, Ohio, is asking for 1000 tons of foundry, and a Kokomo, Ind., con-

sumer is expected to buy a like tonnage.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to	
2.25	\$20.39
Ala. fdy., sil. 1.75 to 2.25..	\$20.19 to 20.69
Ala. fdy., sil. 2.25 to 2.75..	20.69 to 21.19
Tenn. fdy., sil. 1.75 to 2.25	20.19
S'th'n Ohio silvery 8 per	
cent	27.89 to 28.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—Bookings in the past week have been of fairly liberal proportions, and in the case of district sheet mills have about held pace with production. Specifications have been well distributed among consuming industries, an increasing volume of business having come from automobile manufacturers. Sheet steel prices have not yet been seriously tested, although indications are that consumers are not offering effective resistance to the increase of \$2 a ton in all grades. Sheet mill operations continue at about 100 per cent of capacity, with no decline in production in sight. Makers of rail steel reinforcing bars are quoting 1.90c. to 1.95c. base mill, and are insisting upon

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.	
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinf. bars.....	3.15c.
Rail steel reinf. bars.....	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex.....	3.85c.
Squares	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c't'd nails, base 100 lb. keg..	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in.....	\$18.00
4-in.....	38.00
Seamless steel boiler tubes, 2-in.....	19.00
4-in.....	39.00

Malleable Castings Output Remains High

WASHINGTON, Nov. 27.—Bookings of malleable castings in October totaled 55,909 net tons, according to reports received by the Department of Commerce from 130 establishments, six of which with an aggregate monthly capacity of 3850 tons were idle during the month. Orders in September amounted to 55,278 tons. Production in October, the second highest since that of March, 1926, was 63,274 tons, or 69.8 per cent of a monthly capacity of 90,713 tons. The capacity for 1928 is based on the average monthly production for the best six consecutive months since Jan. 1, 1919. Output in September was 56,650 tons, or 63.2 per cent of a monthly capacity of 89,696 tons. Shipments in October were 55,423 tons, against 55,645 tons in September.

For the 10 months ended with October orders totaled 547,948 tons, against 480,319 tons for the corresponding period of last year, and 564,158 tons for all of last year. Production was 592,432 tons, or 65.1 per cent of a capacity of 910,609 tons, compared with 542,667 tons, or 51.5 per cent of a capacity of 1,052,386 tons. Shipments were 561,744 tons and 528,454 tons respectively.

Buffalo

Pig Iron Market Less Active, but Prices Are Steady—Steel Mills Continue 90 Per Cent Operations

BUFFALO, Nov. 27.—The pig iron market has not been active and bookings have been light, though prices are being pretty well maintained. The Eastern section sent about 2000 tons of business to a local furnace, including two lots of 500 tons each and one lot of 1000 tons, malleable and foundry. Probably not more than 1000 tons was booked from the immediate Buffalo territory. A New Jersey inquiry calls for 2000 to 3000 tons of foundry, and a recent order from the East was for 400 tons. The melt is exceptionally high throughout the territory served by the Buffalo furnaces and shipments are steady. Canal shipments are off for the year. Producers expect heavy buying soon for first quarter requirements. Operations remain the same.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil.	1.75 to 2.25	\$18.00 to \$18.50
No. 2X fdy., sil.	2.25 to 2.75	18.50 to 19.00
No. 1X fdy., sil.	2.75 to 3.25	19.50 to 20.00
Malleable sil. up to 2.25.		18.50 to 19.00
Basic		17.50 to 18.00
Lake Superior charcoal...		27.28

Finished Iron and Steel.—Sheet business is being maintained at the regular prices. Inquiry from the automobile trade for bolts and nuts is heavy, though railroad business is not shaping up well. Prices are firm. Reinforcing bar business is lighter. Warehouse business in all kinds of material continues good. Structural awards are not heavy. Operations of

mills continue at about 90 per cent or better.

Old Material.—This market in the past week has been quiet, with little new buying. There is a tendency to keep inventories down as the first of the year approaches. Four of the blast furnace interests have been in the market the past week for scrap, paying \$11.50 for cast iron borings. No. 1 heavy melting steel is still held at \$16.50. No. 2 heavy melting steel is not plentiful for Pittsburgh and Youngstown delivery. Some sales of knuckles and couplers and rolled steel wheels have been made at quoted prices, and a small lot of No. 1 machine cast scrap was sold at \$15.75.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.	\$15.50 to \$16.50
No. 2 heavy melting steel.	14.25
Scrap rails	15.50 to 16.00
Hydraulic comp. sheets....	14.25
Hand bundled sheets.....	12.00 to 12.50
Drop forge flashings.....	13.50 to 14.00
No. 1 busheling.....	14.50 to 15.50
Hvy. steel axle turnings....	13.50 to 14.00
Machine shop turnings....	7.50 to 8.00
No. 1 railroad wrought....	14.50 to 15.00
Acid Open-Hearth Grades	
Knuckles and couplers....	17.00 to 17.50
Coll and leaf springs.....	17.50 to 18.00
Rolled steel wheels.....	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50
Electric Furnace Grades	
Short shov. steel turnings.	11.00 to 11.50
Blast Furnace Grades	
Short shov. steel turnings.	11.00 to 11.50
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 12.00
No. 2 busheling	11.00 to 12.00
Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast....	15.50 to 16.00
Stove plate	14.50 to 14.75
Locomotive grate bars....	13.00 to 13.50
Steel rails, 3 ft. and under.	17.50 to 18.00
Cast iron carwheels.....	13.00 to 13.50
Malleable Grades	
Industrial	16.00 to 16.50
Railroad	16.00 to 16.50
Agricultural	16.00 to 16.50

Warehouse Prices, f.o.b. Buffalo

Base per Lb.	
Plates and struc. shapes.....	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds	3.95c.
Cold rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.85c.
Blue ann'd sheets (No. 10).....	3.50c.
Com. wire nails, base per keg.....	\$3.60
Black wire, base per 100 lb.....	3.75

Reinforcing Steel

New Projects Call for 8800 Tons

WITH two high schools in Chicago calling for 2100 tons, a sewer project at St. Louis for 2000 tons, and a warehouse at Chicago for 1600 tons, new projects brought out in the last week will require 8800 tons of bars. Awards of 3800 tons included 1800 tons for building at the University of California. Awards follow:

NEW YORK, 185 tons, Evander Childs High School, to Tidewater Structural Materials Corporation.

AMENIA, N. Y., 660 tons, power house; from M. Kantrovitz, Albany, N. Y., general contractor, to Concrete Steel Co.

NUTLEY, N. J., 175 tons, manufacturing

building for Hoffmann LaRoche Chemical Co., to Igoo Brothers.

CINCINNATI, 250 tons, Heberle School, to Pollak Steel Co.

CHICAGO, 300 tons of rail steel bars, sales building for Studebaker Corporation, to Inland Steel Co.

CHICAGO, 100 tons of rail steel bars, manufacturing building for Hump Hairpin Co., to Inland Steel Co.

CHICAGO, 100 tons, social science building for University of Chicago, to Joseph T. Ryerson & Son, Inc.

CHICAGO, 200 tons of rail steel bars, apartment building at Ashland Avenue and Pratt Boulevard, to Calumet Steel Co.

SEATTLE, 100 tons, Third Avenue South paving, to Northwest Steel Rolling Mills.

WALLA WALLA, WASH., 100 tons, Veterans' Hospital, to unnamed interest.

SACRAMENTO, CAL., 127 tons, highway

work in San Luis Obispo County, to unnamed interest.

BERKELEY, CAL., 1800 tons, Life Science Building, University of California, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW HAVEN, CONN., 200 tons, armory.

NEW YORK, 200 tons, Lincoln High School; George F. Driscoll Co., Brooklyn, general contractor.

JERSEY CITY, 125 tons, laboratory for Port of New York Authority.

HACKENSACK, N. J., 200 tons, bridge work for Pennsylvania Railroad; Foundation Co., general contractor.

CINCINNATI, 100 tons, hangar for municipal airport.

CHICAGO, 150 tons, sewer project for Sanitary District.

CHICAGO, 700 tons, apartment building on Lake Shore Drive; R. DeGolyer, architect.

CHICAGO, 100 tons, naval armory; Zackery Davis, architect.

CHICAGO, 1600 tons, revised bids for General Electric warehouse; Graham, Anderson, Probst & White, architects.

CHICAGO, 2190 tons, two newly projected high schools and two projects being refigured.

CHICAGO, tonnage not stated, eight-story apartment building at Jackson Boulevard and Hamlin Avenue; Rissman & Hirschfeld, architects.

ROCKFORD, ILL., 190 tons, St. Anthony's Hospital.

ST. LOUIS, 2000 tons, Board of Public Service for third unit of River Des Peres sewer project.

SACRAMENTO, CAL., 275 tons, highway work in Imperial County; bids Dec. 19.

SACRAMENTO, 103 tons, highway work in San Diego County; bids Dec. 12.

SACRAMENTO, 188 tons, bridge near Benham; Paul N. White, Santa Monica, low bidder.

PORTLAND, ORE., 400 tons, school; bids being taken.

LOS ANGELES, 290 tons, apartment building, Hillcrest and Franklin Streets; bids being taken.

Detroit Scrap Market Has Firm Tone

DETROIT, Nov. 27.—The market on old material has a very firm tone, with No. 1 busheling showing an advance of 50c. per ton and flashings making a gradual advance over the past 10 days or two weeks of 75c. per ton. The latter material is being used considerably by foundries in the district and this increased local consumption has been a strong factor in the advance. Other prices are as quoted a week ago.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov.	
steel	\$13.00 to \$13.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.50 to 9.00
No. 1 machinery cast.....	14.00 to 15.00
Automobile cast.....	19.00 to 20.50
Hydraul. comp. sheets....	12.25 to 12.75
Stove plate	11.00 to 12.00
No. 1 busheling	11.00 to 11.50
Sheet clippings	8.00 to 8.50
Flashings	11.50 to 12.00

The David J. Joseph Co., 124 Harrison Avenue, Cincinnati, old material dealer, on Dec. 1 is moving its offices to the American Building, Central Parkway and Walnut Street.

Non-Ferrous Metal Markets

Copper Quiet and Firm, Tin Active and Higher, Lead Sales Large, Zinc Buying Heavy With Prices Higher

NEW YORK, Nov. 27.

Copper.—Generally the market is very quiet and buying is confined to fill-in requirements and to some future positions as far ahead as February. Domestic consumers have been buying some December metal, but are well covered for January and nearly so for February. The foreign market is quieter than for some time, although sales for the month thus far are about 30,000 tons; November domestic sales are estimated at 35,000 tons. There is very little inquiry for March metal and still less disposition on the part of producers to sell it. Prices continue very firm and unchanged at 16c., delivered in the Connecticut Valley, for electrolytic copper,

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY						
	Nov. 27	Nov. 26	Nov. 24	Nov. 23	Nov. 22	Nov. 21
Lake copper, New York.....	16.12½	16.12½	16.12½	16.12½	16.12½	16.12½
Electrolytic copper, N. Y.*.....	15.75	15.75	15.75	15.75	15.75	15.75
Straits tin, spot, N. Y.	52.87½	52.87½	...	52.25	51.37½	51.57½
Lead, New York.....	6.35	6.35	6.35	6.35	6.35	6.35
Lead, St. Louis.....	6.22½	6.22½	6.20	6.20	6.20	6.17½
Zinc, New York.....	6.70	6.67½	6.60	6.60	6.60	6.60
Zinc, St. Louis.....	6.35	6.32½	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price ¼c. higher.

per, with the official quotation of Copper Exporters, Inc., at 16.25c., c.i.f. European ports. The Lake copper market is exceedingly quiet and firm at 16c. to 16.12½c., delivered.

Tin.—Over 2000 tons was sold in an active week ended with Nov. 24, and both dealers and consumers were good buyers. Profit taking on some days did not disturb the market and all offerings were easily absorbed. Straits shipments for November will apparently be very large. At the end of last week the total was close to 9000 tons and the estimate of 10,000 tons for the month will probably be fulfilled. Stocks of tin in London, at approximately 5400 tons, show an increase, but the greater part of this is in control of market manipulators who have virtually taken it out of the market. They thus have a firm grip on the course of prices, but some day this metal must be sold. Prices

both here and abroad have advanced sharply and spot Straits tin sold here today at 52.87½c., New York. London prices were considerably higher than a week ago, with spot standard quoted at £239 2s. 6d., future standard at £236 and spot Straits at £239 5s. The Singapore market today was £237 12s. 6d. The market yesterday was moderately active, with about 200 tons changing hands, but today it has been very quiet. Arrivals thus far this month have been 4825 tons, with 5895 tons reported afloat.

Lead.—Sales have been in very good volume practically every day and prices are stiffer in the West. December delivery is principally involved, but there have been sales of spot and January metal. The St. Louis price, which was 6.17½c. last week, is now generally at 6.22½c., with perhaps a little metal still available at 6.20c. The contract price of

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	52.00c. to 53.00c.
Tin, bar	54.00c. to 55.00c.
Copper, Lake	17.00c.
Copper, electrolytic	16.75c.
Copper, casting	16.00c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig.....	7.25c. to 7.75c.
Lead, bar	9.00c. to 10.00c.
Antimony, Asiatic	12.50c. to 13.50c.
Aluminum No. 1 ingots for re-melting (guarant'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy, 24.00c. to 25.00c.	
Babbitt metal, commerc'l grade, 30.00c. to 40.00c.	
Solder, ½ and ½	33.00c. to 34.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	57.25c.
Tin, bar	59.25c.
Copper, Lake	17.00c.
Copper, electrolytic	17.00c.
Copper, casting	16.75c.
Zinc, slab	8.00c.
Lead, American pig.....	6.85c. to 7.10c.
Lead, bar	9.50c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade.....	18.75c.
Babbitt metal, high grade.....	60.75c.
Solder, ½ and ½	34.50c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	20.25c.
Copper, hot rolled.....	25.00c.
Copper, cold rolled, 14 oz. and heavier	26.25c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes.....	23.25c.
Brass Rods.....	18.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on brass and copper products are unchanged. Zinc sheets have been quoted at 9.75c., base, since July 30, and lead full sheets at 10.25c. to 10.50c. since Nov. 15.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	20.50c.
Copper, hot rolled	25.00c.
Zinc	9.75c.
Lead (full sheets).....	10.25c. to 10.50c.
Seamless Tubes—	
High brass	25.37½c.
Copper	26.37½c.

Rods—	
High brass	18.25c.
Naval brass	20.25c.

Wire—	
Copper	17.87½c.
High brass	21.00c.
Copper in Rolls.....	24.00c.
Brazed Brass Tubing.....	23.50c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 6 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	13.75c.	15.00c.
Copper, hvy. and wire	13.50c.	14.50c.
Copper, light and bottoms	11.50c.	12.75c.
Brass, heavy	7.75c.	9.00c.
Brass, light	6.50c.	7.50c.
Hvy. machine composition	10.50c.	11.50c.
No. 1 yel. brass turnings	9.25c.	9.375c.
No. 1 red brass or compos. turnings.....	9.50c.	10.50c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.625c.
Sheet aluminum	13.00c.	15.00c.
Cast aluminum	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—	
High brass	20.50c.
Copper, hot rolled	25.00c.
Copper, cold rolled, 14 oz. and heavier	27.25c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	26.87½c.
Copper	27.87½c.
Brass Rods	18.25c.
Brazed Brass Tubes.....	23.50c.

the leading interest is still unchanged at 6.35c., New York.

Zinc.—Conditions have radically changed the past week. Galvanizers generally have come into the market and a very large amount of prime Western zinc has been sold for delivery in the first quarter. As a result, prices have advanced for the first time since Aug. 7. At that time, 6.25c., East St. Louis, was established and it had prevailed until yesterday, when metal was sold at 6.30c. Today the market has further stiffened and prices are generally at 6.35c., although a little metal may still possibly be obtained at 6.32½c. As the result of the more active market, sales of ore last week at Joplin were high at about 15,300 tons at the unchanged price of \$40. Output was a little larger at 11,500 tons and ore shipments were over 12,300 tons. Today the market for prime Western is quieter, with producers somewhat reserved as to future commitments.

Antimony.—In a very quiet market, Chinese metal is easier at 10c., duty paid, New York, for all positions.

Nickel.—Ingot nickel in wholesale lots is quoted unchanged at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Nov. 27.—Both spot and future purchases are active in a market which shows mixed tendencies. Prices for copper are lower and quotations for lead, zinc and tin are higher. The old metal market is without feature.

Prices, per lb., in carload lots: Lake copper 16.50c.; tin, 51.12½c.; lead, 6.25c.; zinc, 6.45c.; in less-than-carload lots; antimony, 11c. On old metals we quote copper wire, crucible shapes and copper clips, 12.50c.; copper bottoms, 11.25c.; red brass, 10.75c.; yellow brass, 8.25c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 27c.; tin foil, 27c.; block tin, 39c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

Railroad Equipment

Orders for 2900 Freight Cars—New Inquiries Amount to 4000

WITH 2000 automobile cars bought by the Wabash and 700 miscellaneous freight cars ordered by the Chicago & North Western, car purchases in the last week totaled 2900. New and contemplated inquiry for more than 4000 cars included 2500 for the Louisville & Nashville, 250 for the Chicago, Rock Island & Pacific and 1025 for the Atchison, Topeka & Santa Fe. Details of the week's business follow:

Wheeling & Lake Erie will build five six-wheel and five eight-wheel switching locomotives in its own shops.

Louisville & Nashville will soon make inquiry for 1200 50-ton and 250 70-ton gondola cars, 750 50-ton automobile cars, 300 50-ton box cars, 12 passenger coaches, six baggage and four dining cars.

Wabash has ordered 1500 automobile cars from American Car & Foundry Co. and 500 from Pullman Car & Mfg. Corporation.

Seaboard Air Line contemplates purchase of 200 all-steel hopper cars.

Missouri Pacific is inquiring for 100 steel underframes.

Chicago, Rock Island & Pacific has come into market for 250 ballast cars. This brings road's total inquiries to 3400 freight and 22 passenger cars.

Hercules Powder Co., Wilmington, Del., has ordered 10 50-ton tank cars from American Car & Foundry Co.

St. Louis-Southwestern has ordered steel underframes and parts for rebuilding five ballast cars from American Car & Foundry Co.

Chicago & Eastern Illinois may buy 300 automobile cars instead of 100 as reported previously.

Chicago, St. Paul, Minneapolis & Omaha has ordered four gas-electric passenger cars from Pullman Car & Mfg. Corporation.

Chesapeake & Ohio has ordered six gas-electric rail motor cars from J. G. Brill Co.

Green Bay & Western is inquiring for four or five combination baggage and mail cars.

Chicago & North Western has ordered 400 composite gondola cars from Standard Steel Car Co., 300 flat cars from Pressed Steel Car Co., 100 caboose car underframes from American Car & Foundry Co. and 10 gas-electric rail motor cars from Pullman Car & Mfg. Corporation.

Montour Railroad has ordered 10 caboose cars from Standard Steel Car Co. Armour Car Lines, Chicago, have ordered 500 underframes for refrigerator cars from Bettendorf Co.

Fruit Growers Express has increased its inquiry for refrigerator car underframes from 50 to 200.

Nevada Consolidated Copper Co. has ordered 80 ore cars from Koppel Industrial Car & Equipment Co.

Atchison, Topeka & Santa Fe is in market for 200 flat, 500 single-deck stock and 250 double-deck stock cars, 125 caboose cars and 16 baggage cars.

Great Northern has purchased 500 underframes from Pressed Steel Car Co. and is inquiring for three dining cars.

Otis Steel Co. Puts New Open-Hearth in Use

The Otis Steel Co., Cleveland, placed a new open-hearth furnace in operation the past week, this being the third new furnace to be built and started this year. This gives the company eight open-hearth furnaces at its Riverside plant, with an annual ingot capacity of 720,000 tons. In addition, it has an annual ingot capacity of 170,000 tons at its Lakeside plant.

Ludlum Steel Co. to Expand Capacity

The Ludlum Steel Co., Watervliet, N. Y., and the Atlas Steel Corporation, Dunkirk, N. Y., have called special meetings of stockholders to vote on the consolidation of the two companies. If the vote is favorable, some plan of financing will be arranged that will retire all of the present securities of both companies standing ahead of common stocks. The Ludlum company requires increased capacity for the manufacture of its special brands of valve steel and stainless steels and also for the new series of chrome nickel steels which will be manufactured under its license agreement with the Krupp Nirosta Co., Inc.

The Ludlum company will also erect a plant for the manufacture of tungsten carbide tools and dies under combined patents of the Krupp works and the General Electric Co. Construction of the plant will be begun at once and the design will be based upon specifications supplied by Prof. Dr. Benno Strauss of the Krupp research laboratory, who is at present in this country.

Directors have also authorized the construction of a plant for the drawing of chrome nickel and other highly alloyed steel wire by a German process for which the company has acquired the exclusive American rights. Orders have already been placed in Germany for 30 special wire drawing machines together with the necessary annealing apparatus. In about five months the company expects to be able to supply non-corrosive wire in sizes ranging from 0.195 in. to 0.001 in.

New Tin Trade Association Elects Officers

C. S. J. Trench of C. S. Trench & Co., New York, has been elected president of the American Tin Trade Association, recently formed to supplement the activities of the new National Metal Exchange.

Other officers will be A. B. Hall of the National Lead Co., vice-president, and Martin H. Wehncke of Brandeis, Goldschmidt & Co., treasurer. In addition to the officers, the directors will include Edwin Groves of J. W. Phyfe & Co., John Hughes of the United States Steel Corporation, James E. Pope of the Pope Trading Corporation and Erwin Vogelsang of Lewis Lazarus & Sons of New York, Inc.

The new association has adopted a specific quality tin contract, which will govern dealings in Straits and other specific qualities of tin. It is modeled after the style of the present New York Metal Exchange tin contract, which will no longer be available after Dec. 1, when the New York Metal Exchange goes into liquidation. Nearly all classes of dealers in and large consumers of tin have joined the new association. The main object is to assure uniform contracts for all transactions in the metal.

PERSONAL

COL. FRANK A. SCOTT, chairman of the board of Warner & Swasey Co., Cleveland, has resigned as chief of the Cleveland Ordnance District, which position he has held for four years. His resignation was necessitated by poor health. As head of the Cleveland Ordnance District and member of the military organization created under the National Defense Act, Colonel Scott has supervised the Army's program of industrial preparedness in the important manufacturing area extending from Erie, Pa., to Toledo and from the shores of Lake Erie to Columbus. To show its appreciation of his services and regret over his retirement the Army has presented Colonel Scott with an official resolution embossed on parchment. The presentation was made at his home in Mentor, Ohio, Nov. 22, by Brig. Gen. Colden L'H. Ruggles, assistant chief of ordnance, who in making the presentation said: "The Army is sorrowful today because it is losing the services of a great leader. And we regard you, Colonel Scott, as truly a casualty of the World War as the man who was wounded in performance of his duty on the battle front." Colonel Scott stood foremost among the industrial leaders who rendered preeminent service during the World War. He served both as chairman of the General Munitions Board and later as chairman of the War Industries Board.

ERNEST F. DUBRUL, general manager of the National Machine Tool Builders Association, was the guest of the Boston chapter of the National Association of Cost Accountants on Nov. 22, at the Boston Chamber of Commerce. He spoke on "Depreciation on the Basis of Replacement Values."

THOMAS W. KENNEDY, vice-president in charge of blast furnace operations for the Massachusetts Gas Companies, Boston, and president and manager of the Mystic Iron Works, Everett, Mass., has been made a trustee and vice-president of the New England Fuel & Transportation Co., a Massachusetts Gas Companies subsidiary. Mr. Kennedy also has been made a director of the New England Coal & Coke Co., the Prince-Wick Coal Co., the Pemberton Fuel Co., the Long Branch Coal Co., the E. E. White Coal Co., the Glencoe Coal Co., and the East Gulf Coal Co. With the exception of the New England Coal & Coke Co., the last mentioned companies are subsidiaries of the C. C. B. Smokeless Coal Co. and are located in the New River field of West Virginia. The C. C. B. Smokeless Coal Co. is a subsidiary of the parent company, as is the New England Coal & Coke Co.

O. NEEDHAM, formerly section engineer in charge of steel mill engineer-

ing for the Westinghouse Electric & Mfg. Co., has been appointed assistant superintendent in the testing department, East Pittsburgh works. WILLIAM B. SHIRK succeeds Mr. Needham. The latter has been with the Westinghouse company since just after his graduation in 1909 from the Oklahoma Agricultural and Mechanical College. Mr. Shirk was graduated in electrical engineering from Lehigh University in 1920 and before joining the Westinghouse company in 1925 he was assistant superintendent of electrical equipment for the Bethlehem Steel Co.

GEORGE R. JOHNSON has been named Pittsburgh resident agent for the M. A. Hanna Co. He succeeds GEORGE D. BUCKWELL, who resigned several months ago to become manager of pig iron, coke and by-products sales of the Davison Coke & Iron Co. Mr. Johnson has been with the Hanna company since 1909, for 11 years at the Pittsburgh, Youngstown & Ashtabula Ore Co. docks at Ashtabula, Ohio, and for eight years as cashier at the Cherry Valley furnace, Leetonia, Ohio. Since early this year he has been engaged in pig iron sales in the Pittsburgh office of the company.

HERBERT MAY, assistant treasurer Union Drawn Steel Co., Beaver Falls, Pa., has been elected vice-president of the company and will continue as assistant treasurer.

K. P. SWENSEN has been placed in charge of the New York office, 117 Liberty Street, of the Radiore Co., Los Angeles. He has had wide experience in mining engineering and electrical prospecting.

WADSWORTH DOSTER, recently Eastern representative for the Mackintosh-Hemphill Co., Pittsburgh, has been appointed to serve in a similar capacity with the United Engineering & Foundry Co., Pittsburgh. Previously he was for many years manager of the Blake & Johnson Co., Waterbury, Conn.

P. N. GUTHRIE, JR., since 1909 associated with the South Chester Tube Co., South Chester, Pa., has been appointed vice-president in charge of sales for the Reading Iron Co., Reading, Pa. The general sales offices of the company will be transferred from Reading, Pa., to 30 Church Street, New York, where Mr. Guthrie will maintain headquarters. H. F. MATERN will continue as general sales manager. Mr. Guthrie was born in Pittsburgh and his first business association was with the Black Diamond Steel Works in that city. Before joining the South Chester company he was for several years identified with

the gas light industry in New York State.

GEORGE E. EVANS, for the past 31 years manager of the Ontario division of the Dominion Bridge Co., Toronto, has retired from active service and has been succeeded by A. ROSS ROBERTSON. Mr. Evans will remain with the company in an advisory capacity.

S. JANOVICI has been elected president and treasurer, and J. GILBERT MASON, JR., vice-president and secretary, of the Orelite Co., Inc., 109 Broad Street, New York, producer of natural and calcined diatomaceous earth for insulation purposes. A. JANOVICI has been named assistant secretary of the company and M. J. KAUFMAN, assistant treasurer.

DR. HARVEY NATHANIEL DAVIS, for the last nine years professor of mechanical engineering at Harvard University, was inaugurated as president of the Stevens Institute of Technology on Nov. 23. At a scientific session preceding the installation ceremonies papers were read by DR. ROBERT A. MILLIKAN, of the California Institute of Technology, and DR. JOHN JOHNSTON, director of research for the United States Steel Corporation. The occasion also marked the unveiling of a memorial tablet to the late DR. ALEXANDER C. HUMPHREYS, for 25 years president of Stevens.

M. CROUSE KLOCK, Syracuse, N. Y., has been elected a director of the Crucible Steel Co. of America, New York.

E. V. NIXON, of Thompsons Engineering & Pipe Co., Ltd., Castlemaine, Victoria, Australia, is spending a short time in the United States on his return home from a visit to England. He is studying steel foundry association activities. His present address is the Union League Club, Thirty-ninth Street and Fifth Avenue, New York; he plans to sail from Vancouver, B. C., Dec. 12.

CHARLES B. KING, vice-president and general manager of the Marion Steam Shovel Co., Marion, Ohio, was elected president of the Ohio Manufacturers Association at the annual meeting held in Cleveland, Nov. 21. New vice-presidents included: J. D. COX, JR., president Cleveland Twist Drill Co.; CHARLES R. CLAPP, National Supply Co., Toledo; P. O. GEIER, Cincinnati Milling Machine Co., Cincinnati; T. J. BARNES, Barnes Mfg. Co., Mansfield, and A. F. SPARKS, James Leffel Co., Springfield.

GEORGE ADAMS has been appointed sales manager of the Bunting Brass & Bronze Co., Toledo, Ohio.

FRANK P. MCKIBBEN, Blackgap, Pa., structural steel engineer, addressed the Engineers Society of Milwaukee at its monthly dinner meeting on Nov.

21, his topic being "Electrically Welded Steel Buildings." The meeting was under the auspices of the Milwaukee chapter, American Institute of Electrical Engineers.

HARRY W. TERRY, formerly sales manager Bayley Blower Co., Milwaukee, and widely known as a merchandising and engineering counselor, has joined the industrial advertising division of the Cramer-Krasselt Co., Milwaukee advertising agency.

H. N. FELTON, since 1927 Milwaukee branch manager for the Wagner Electric Corporation, St. Louis, has been appointed branch manager of the corporation's New York office, succeeding E. W. GOLDSCHMIDT. Mr. Felton was graduated from the University of Illinois in 1917 and went with the Wagner corporation in 1919 as a salesman in the Chicago district. He has been identified with the Milwaukee office since 1920. E. T. COUP, who has been in charge of the Cincinnati office since 1921, has been named to succeed Mr. Felton at Milwaukee. He has been identified with the company since his graduation from the University of Wisconsin in 1912, having served previously at St. Louis, Chicago, Boston and Milwaukee. PAUL F. FORSYTH succeeds Mr. Coup at Cincinnati. He was graduated from Pennsylvania State College in 1912 and before joining the Wagner organization in 1915 he was associated with the J. G. White Co., New York, and the Detroit Edison Co., Detroit. He has since served the St. Louis company in Chicago, Detroit and Cincinnati.

BARNEY G. TANG, assistant general superintendent of the Schenectady, N. Y., works, General Electric Co., has been named general superintendent, succeeding the late JAMES A. SMITH. He joined the company in 1898 and served in the searchlight, switchboard and switch departments. Later he became a subforeman in the tool room and subsequently superintendent of a plant section. JOHN D. HARNDEN, recently superintendent of the testing department, has been appointed assistant to the works manager, F. L. KEMP succeeding him in the testing department. LEROY BEERS has been named plant engineer, a newly created position.

E. W. GOLDSCHMIDT, Eastern district manager of the Wagner Electric Corporation, St. Louis, with headquarters at New York, who has represented the company in that city for 25 years, has retired from his active duties and will devote his entire time to the electric light and power industry as chairman of the exhibition committee of the National Electric Light Association.

R. W. RUDDON, first vice-president of the Federal Motor Truck Co., Detroit, has been appointed general manager of the company and in his new

capacity will take over part of the responsibilities formerly held by M. L. PULCHER, who has been president and general manager. Mr. Pulcher will continue as president of the company. Mr. Ruddon joined the Federal organization 15 years ago as secretary to Mr. Pulcher. In 1918 he became assistant secretary of the company; in 1924, assistant general manager, and early this year, first vice-president. During the last few years his work has largely been centered about the financial affairs of the company.

DR. ROBERT REINER, president Robert Reiner, Inc., Weehawken, N. J., manufacturer of textile machinery, addressed the monthly meeting of the Credit Association of the Building Trades of New York on Nov. 27.

VERNON C. WARD, recently manager of sales in the steel construction department of the Jones & Laughlin Steel Corporation, Pittsburgh, has been appointed a vice-president of the J. B. French Co., 30 North Michigan Avenue, Chicago, building contractor. Before joining the Jones & Laughlin organization he was contracting manager at Chicago for the American Bridge Co.

EARL C. REED and LEWIS N. MURRAY, organizers of the Continental Heater Corporation, Dunkirk, N. Y., which last year became a part of the National Radiator Corporation, are president, and vice-president and treasurer, respectively, of the Dunkirk Radiator Corporation, Dunkirk, which has been organized to manufacture radiators and heaters. NEWELL F. GOULD, who is secretary of the new company, was formerly treasurer of the United States Radiator Co., Detroit, and also vice-president of the Marshal Valve Co., Dunkirk. Among the directors are WILLIAM C. MURRAY, formerly manager of the Utica Heater Mfg. Co., Utica, N. Y., and HOWARD REED, recently plant superintendent of the Continental corporation.

ALBERT N. DINGEE, for the last 18 years identified with the sales department of the Electric Storage Battery Co., Philadelphia, has been appointed advertising manager to succeed the late ALFRED B. KREITZBURG.

CARL W. PEIRCE, late open-hearth superintendent of the Mansfield Sheet & Tin Plate Co., Mansfield, Ohio, has become connected with the Arthur L. Stevens Corporation, 205 West Wacker Drive, Chicago. This organization has developed a form of combustion control for open-hearth furnaces which is said to have great possibilities. Mr. Peirce, a graduate of Oberlin College, has spent many years in open-hearth work, having been at the South Side plant of Jones & Laughlin Steel Corporation, Gary plant of Illinois Steel Co., the former New York State Steel Co., Buffalo, and elsewhere.

Obituary

GARLAND G. KING, purchasing agent Alliance Machine Co., Alliance, Ohio, died recently at Dalton, Ga., while en route to Florida, where he had spent the winter in recent years. He had been identified with the Alliance company since its organization.

J. MAX. BERNARD, of J. Max. Bernard & Co., Philadelphia, steel, coal and coke merchants, died Nov. 17, at his home near Media, Pa. He was 66 years of age and was well known in the steel and coal trades of the Philadelphia district, where he was identified with his own company for about 25 years, prior to which he was for about seven years associated with C. B. Houston & Co., Philadelphia, steel and coal merchants.

EDGAR H. MORGAN, president of the Arcade Mfg. Co., Freeport, Ill., died suddenly on Nov. 16. He was born at Marlboro, N. Y., in 1848 and moved to Freeport with his parents in 1853. When he was 16 he entered a foundry owned by his uncle and after learning the molders' trade he was admitted to partnership.

IRVING ROSS STANWOOD, of the Charles E. Bedaux Co., New York, died recently. He was born at Needham Heights, Mass., in 1892, and was graduated from Colby College, Waterville, Me. He then became associated with the Winchester Arms Co., New Haven, Conn., and later with the Agar Mfg. Co., Somerville, Mass.

FRANCIS MARION KING, president North Wales Machine Co., North Wales, Pa., and treasurer and general manager Challenge Machine Co., Philadelphia, died on Nov. 20 at his home in Philadelphia, aged 82 years. He was born at Wilmington, N. C., and established the companies with which he was associated 42 years ago.

STRICKLAND LANDIS KNEASS, vice-president of William Sellers & Co., Inc., Philadelphia, died at Daylesford, Pa., on Nov. 25. He was born at Philadelphia in 1861 and was graduated from Rugby Academy. In 1880 he was graduated in civil engineering by the Rensselaer Polytechnic Institute, Troy, N. Y. He became manager of the injector department of the Sellers company in 1895 and had been associated with the company ever since. He was awarded the John Scott Medal and premium of the Franklin Institute in 1900 and in 1926 his exhaust feed-water injector for locomotive boilers again brought him the award.

GEORGE ARTHUR STEPHENS, from 1902 until 1918 president of the Moline Plow Co., Moline, Ill., died on Nov. 20 in New York, where he had been taken the week before for medical treatment. He was 77 years of age. The Moline company has been succeeded by International Harvester Co.

Continental Deliveries Extending

German Lockout Strengthens Prices but Early Settlement May
Bring Reaction—British Pig Iron Market Improving

(By Cable)

LONDON, ENGLAND, Nov. 26.

HOME demand for Cleveland pig iron is improving and withdrawals from stocks at furnaces are averaging 1000 tons a day. Export sales, however, are still restricted. Hematite is active and preparations are being made to blow in two more East Coast furnaces. Prices are stiffening.

The foreign ore situation is improving here, but on the Continent it is affected by the German lockout and stocks are accumulating at Emden and Dutch ports.

Finished iron and steel has not yet been affected by the German situation and business in heavy material is still slow. Some new shipbuilding contracts will require more steel tonnage, but export sales are poor and plate mills are especially in need of work. Semi-finished steel mills are moderately active as foreign supplies are smaller. The Blue Star Line has placed an order for a 12,000-ton motor vessel with Palmer's Shipbuilding & Iron Co.

Tin plate is quiet and mills are in need of orders for the remainder of the year, but well sold for the early part of next year. Current output of tin plate is about 75 per cent of capacity, as several mills have resumed operation, having completed the agreed period of suspension.

Galvanized sheets are moderately

active in small lots and most makers are quoting January as the earliest shipment, with some sales covering January-March delivery. Black sheets are quiet.

Continental markets are quiet in

trade with British buyers, but some activity is reported from other markets. Prices generally are unchanged, but stability is lacking and a decline is expected should the German lockout reach a speedy conclusion.

Belgian Market Advancing

Mills Well Filled Since German Lockout, With Deliveries
Lengthening—British Pig Iron Competitive

ANTWERP, BELGIUM, Nov. 9.—Prices show a decided tendency to advance as a result of the lockout in Germany, which has temporarily removed German mills from the export trade. Buyers, however, are resisting the efforts of mills to obtain advanced prices, so that it is difficult to ascertain the actual market at which business is being transacted. Steel bars have been advanced, and certain other products are on a slightly higher level than in recent weeks. Some desirable tonnages of steel have been booked from Japan, China, India and South America, and deliveries of most mills are extending. If the German lockout remains in effect for a few weeks more, it is believed that the steel market will continue to advance and the recession of business that had been evident will be temporarily arrested.

Pig Iron.—Demand for phosphoric foundry iron continues steady, and the stocks of both producers and consumers are low. The export price is firm at £3 6s. (\$16.04) per ton, f.o.b. Antwerp, which is also the quotation for British Midland iron, f.o.b. Antwerp, so that British furnaces are obtaining some business here. Thomas iron shows weakness because of British competition. Bessemer hematite iron quotations are governed by British offers and continue at £3 14s. to £3 16s. (\$17.98 to \$18.47) per ton, c.i.f. Antwerp, or f.o.b. furnace. Iron and steel scrap prices show further advances despite substantial arrivals of scrap from England. Stocks are limited, with heavy melting steel at 104 Belgas (\$14.45) and No. 1 cast scrap at 130 Belgas (\$18.07).

Semi-Finished Material.—Demand is light, but sellers have only limited

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.....	£0 17½s.		\$4.25	
Bilbao Rubio ore.....	1 2	to £1 2½s.	5.35	to \$5.48
Cleveland No. 1 foundry.	3 8½	to 3 9½	16.64	to 16.89
Cleveland No. 3 foundry.	3 6		16.04	
Cleveland No. 4 foundry.	3 5		15.80	
Cleveland No. 4 forge...	3 4½		15.68	
Cleveland basic (nom.)...	3 5		15.80	
East Coast mixed.....	3 10	to 3 11	17.01	to 17.25
East Coast hematite....	3 10½	to 3 11½	17.13	to 17.37
Rails, 60 lb. and up....	7 15	to 8 5	37.66	to 40.10
Billets	6 5	to 6 10	30.37	to 31.59
Ferromanganese	13 15		66.83	
Ferromanganese (export)	14 0		68.04	
Sheet and tin plate bars,				
Welsh	6 0		29.16	
Tin plate, base box.....	0 18	to 0 18½	4.37	to 4.40
Black sheets, Japanese				
specifications	13 7½		65.00	
C. per Lb.				
Ship plates	7 12½	to 8 2½	1.63	to 1.74
Boiler plates	9 0	to 10 10	1.92	to 2.25
Tees	8 2½	to 8 12½	1.74	to 1.84
Channels	7 7½	to 7 17½	1.58	to 1.69
Beams	7 2½	to 7 12½	1.53	to 1.63
Round bars, ¾ to 3 in..	7 10	to 8 0	1.62	to 1.69
Steel hoops	9 0	to 10 0	1.92	to 2.14
Black sheets, 24 gage...	10 0		2.14	
Galv. sheets, 24 gage...	13 10	to 13 15	2.93	to 2.98
Cold rolled steel strip, 20				
gage (nom.).....	16 0		3.42	

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)				
Foundry pig iron (a):				
Belgium	£3 3s.	to £3 5s.	\$15.31	to \$15.80
France	3 3	to 3 5	15.31	to 15.80
Luxemburg	3 3	to 3 5	15.31	to 15.80
Basic pig iron (a):				
Belgium	3 3		15.31	
France	3 3		15.31	
Luxemburg	3 3		15.31	
Coke	0 18		4.37	
Billets:				
Belgium	5 2		24.78	
France	5 2		24.78	
Merchant bars:				
Belgium	6 4		1.37	
France	6 4		1.37	
Luxemburg	6 4		1.37	
Joists (beams):				
Belgium	5 4		1.15	
France	5 4		1.15	
Luxemburg	5 4		1.15	
Angles:				
Belgium	6 2½		1.35	
¾-in. plate:				
Belgium (a).....	6 13		1.47	
Germany (a).....	6 13		1.47	
¾-in. ship plate:				
Belgium	6 8		1.41	
Luxemburg	6 8		1.41	
Sheets, heavy:				
Belgium	6 1		1.33	
Germany	6 1		1.33	

(a) Nominal.

stocks available, so that prices are firm. It is difficult to obtain prices on blooms, but sheet bars are quoted at £5 2s. (\$24.79) per ton. Billets are commanding £5 3s. (\$25.03) per ton for 2½-in. and £4 19s. (\$24.06) per ton for 3-in., with only small tonnages available.

Finished Material.—Although mills are asking advances on most products because of the German lockout, steel bars alone have registered a definite advance in price. Buyers are withholding business as much as possible, but the volume of tonnage that must be placed is providing considerable activity. Deliveries are extending, and some mills with heavy tonnages booked have practically retired from the market. Sellers seeking business are quoting bars at £6 5s. to £6 6s. per ton (1.38c. to 1.39c. per lb.), and deliveries extend into February and March. Angles are also in good demand and show a tendency to advance, but beam prices are unchanged, with delivery terms shorter than on other products. Medium-size angles are quoted at £5 18s. per ton (1.30c. per lb.), and ordinary specifications of beams, at £5 2s. 6d. per ton (1.13c. per lb.). Corrugated reinforcing bars are firm at £6 7s. per ton (1.40c. per lb.), and hot-rolled hoops, at £6 5s. per ton (1.38c. per lb.). Heavy-gage sheets are firmer, medium gages are inactive with prices unchanged and the light gages, affected by British competition, show a tendency to decline in price.

Europe Expects Sharp Competition in Aluminum

HAMBURG, GERMANY, Nov. 10.—Aluminum producers in Germany are concerned over the possibility of severe price competition next year. The Aktieselskabet Haugvik Smeltwerk, Gromfjord, Norway, is the only important aluminum producer not a member of the international cartel. Recently British interests have acquired the plant and are understood to be increasing its production to a total of 4000 to 5000 tons a year. The company has begun to offer aluminum at less than the cartel price of £95 per ton (20.94c. per lb.), but with only a small output at present has not had much influence on the market. It is estimated that during 1929 this producer will be able to offer close to 4000 tons for export. Its Continental business has been placed in the hands of agents in Switzerland and Germany.

Consumption of the major non-ferrous metals in Germany has almost attained its 1913 level of 760,000 tons, ranging now from 740,000 to 750,000 tons annually of copper, lead, zinc, aluminum, tin and nickel, according to a report received by the Department of Commerce from Trade Commissioner W. T. Daugherty, Berlin.

Steel Imports Are Small

European Mills Quoting Higher Prices Here Than in Other Markets—Japan Asks for Heavy Rails

NEW YORK, Nov. 27.—Importers in New York are offering European steel from stocks, but at present prices are unable to place any further orders with European mills. German producers of strip steel, hoops and bands are evidently willing to quote, but their prices are high and importers are unwilling to risk possible delays in delivery, which might be caused by the German lockout. Importers who are also exporters of both foreign and domestic steel point out that in recent weeks prices obtained from Continental mills have been several dollars a ton higher than quotations on the same specifications for shipment to other foreign markets. On a steel bar specification, an importer in New York recently asked a Continental mill for prices, c.i.f. New York; Buenos Aires, Argentina, and Shanghai, China. The price for delivery to New York was on a \$4 a ton higher basis than to the other two markets.

The United States Court of Customs Appeals has affirmed the judgment of Justice Fischer, sitting in Customs Court, who decided last February that reinforcing bars were to be classified as construction material, taking a duty of 20c. per 100 lb., instead of as bars, which are

dutiable at 30c. per 100 lb. This decision, unless appealed by the Government to the United States Supreme Court, which is not considered likely, will result in considerable refunds on duties paid by importers on reinforcing bars since Justice Fischer's decision. Importers have protested the decision of the Treasury Department classifying bar-sized shapes as bars, because they are produced on a bar mill, and a hearing is expected in the next few months.

Export trade with the Far East continues rather small. There are occasional inquiries for small lots of tin plate from both Japanese and Chinese merchants, and a large Japanese fishing interest is reported to have closed on about 50,000 base boxes of canners' tin plate. The export prices of American mills are substantially unchanged at \$5.20 to \$5.25 per box, c.i.f. Japanese port.

Two large inquiries for heavy rails from Far Eastern railroads are in the market, but the business is expected to go to Continental or Japanese producers. The South Manchuria Railway Co. is inquiring for 25,000 tons of 75 and 100-lb. rails, and the Nankai Electric Railway, in Japan, is taking bids on 16,000 tons of 80 and 100-lb. sections.

German Imports of Advertised American Machinery Large

HAMBURG, GERMANY, Nov. 10.—Germany is a substantial market for certain types of American machinery and equipment. In the first nine months of this year German imports of machinery of all kinds totaled 135,000,000 m. (\$32,175,000). In certain machines the United States furnished nothing and in other equipment the majority of imports were of American origin. Book printing, paper making and sugar mill machinery imports from the United States were of little consequence, most of this equipment coming from Great Britain and Sweden. In agricultural machinery, however, the United States occupies a satisfactory position. Of a total of 115 tractors imported in the first nine months of the year the United States furnished only a few, but of 1634 plows brought into Germany, 65 per cent were from the United States and 16 per cent from Canada. In harvesting machines, imports of which in the first nine months totaled 5460 pieces, only 25 per cent were from the United States and 68 per cent were from Canada.

The difference in the volume of imports of such machines is not so much in price as in adequacy of representation. American, Canadian and Ger-

man prices on agricultural machinery are about the same, but while American made plows are advertised and sold by local agents in 97 German towns, American harvesting machines are sold by only 38 agents and tractors in only six German towns. The result in volume of business seems to be in proportion to the amount of local representation. American manufacturers of typewriters furnished 13,772 of a total of 15,518 imported in the first nine months of the year. German makers, however, exported 54,396 typewriters in this period. Of total imports of 11,438 business machines for offices, the United States furnished Germany with 8531 in the first nine months.

In this period the United States furnished 51 per cent of 1645 internal combustion engines, 53 per cent of 1087 motor-driven sewing machines, 33 1/3 per cent of 3528 laundry machines, 41 per cent of 7453 fire-fighting machines, 59.8 per cent of 10,950 metal-working tools, 37 per cent of 54 units of coal-washing and sorting machines, 11 per cent of 16,462 blowing and ventilating engines and 57 per cent of 1119 leather-working machines.

The American Institute of Weights and Measures will hold its annual meeting in the rooms of the institute at 115 Broadway, New York, on Thursday, Dec. 6, at 2.30 p. m.

Export Movement Grows Larger

October Total Fourth Highest of Past Seven Years—

Was 50 Per Cent Above Last Year—

Imports Above September

WASHINGTON, Nov. 24.—Rising to 256,870 gross tons, exports of iron and steel products from the United States in October reflected an increase of 28,814 tons or 12.6 per cent over the 228,056 tons exported in September. Imports in October, amounting to 63,880 tons, made a gain of 10.5 per cent over the 57,782 tons imported the preceding month. For the 10 months ended with October exports aggregated 2,384,301 tons, or 29.8 per cent above the 1,836,730 tons exported during the corresponding period of last year. Imports for the 10 months of the current year totaled 629,301 tons, or only 0.9 per cent in excess of the 623,922 tons imported during the corresponding period of 1927.

Average daily export movement in October was 8293 tons, against 7602 tons in September and 9268 tons in August. The October daily movement

United States Imports of Iron and Steel Products in October

(In Gross Tons)

Austria	50
Belgium	10,371
Czechoslovakia	614
France	8,251
Germany	11,985
Italy	317
Netherlands	1,153
Norway	2,060
Sweden	2,570
United Kingdom	12,140
Europe	49,511
Canada	9,725
Mexico	31
British India	4,610
China	3
Total	63,880

was well above the average of 7889 tons for the 10 months of the present year and 6042 tons for the 10-month period of last year. The average

daily import movement in October was 2061 tons, against 1926 tons in September, 2063 tons for the 10 months of 1928 and 2052 tons for the corresponding period of 1927.

Total exports were the fourth highest this year and were above those for any month in 1922 to 1927, inclusive. Exports of rolled and finished material were the third highest of the year and were exceeded only once (January) in 1927. Semi-finished steel exported made the greatest tonnage since May, 1920. Structural steel exports were the heaviest in over five years.

Principal Export Items

Increases in the export movement in October were made in all but three classes. The largest item was scrap, with a total of 39,413 tons, of which 25,650 tons went to Japan and 11,741

Exports of Iron and Steel from the United States

(In Gross Tons)

	October		10 Months Ended October	
	1928	1927	1928	1927
Pig iron	11,532	4,735	64,091	39,823
Ferromanganese	143	1,005	8,435	1,539
Scrap	39,413	25,231	462,700	201,055
Pig iron, ferroalloys and scrap	51,088	30,971	535,226	242,417
Ingots, blooms, billets, sheet bar, skelp	21,885	9,921	128,294	80,644
Wire rods	3,425	2,276	31,986	14,060
Semi-finished steel	25,310	12,197	160,280	94,704
Steel bars	16,264	9,207	125,233	92,501
Alloy steel bars	1,211	799	12,318	4,827
Iron bars	136	144	3,058	3,626
Plates, iron and steel	16,456	8,668	126,013	112,394
Sheets, galvanized	13,046	9,709	125,745	132,149
Sheets, black steel	14,258	8,856	154,826	134,730
Sheets, black iron	1,741	851	13,166	13,681
Hoops, bands, strip steel	5,433	2,993	47,488	36,273
Tin plate; terne plate	18,180	17,940	203,652	219,913
Structural shapes, plain material	25,847	13,202	157,939	120,020
Structural material, fabricated	7,413	5,803	74,851	55,336
Steel rails	9,347	14,070	170,477	151,146
Rail fastenings, switches, frogs, etc.	2,330	1,763	36,590	27,079
Boiler tubes, welded pipe and fittings	24,931	14,985	218,197	221,772
Plain wire	4,380	3,233	38,282	29,071
Barbed wire and woven wire fencing	7,397	5,235	61,494	43,844
Wire cloth and screening	107	200	1,505	1,955
Wire rope	445	278	4,294	3,669
Wire nails	968	90	12,696	6,685
Other nails and tacks	886	1,512	8,202	7,823
Horseshoes	35	76	375	470
Bolts, nuts, rivets and washers, except track	1,117	1,033	10,833	10,053
Rolled and finished steel	171,928	120,652	1,607,239	1,429,017
Cast iron pipe and fittings	2,824	3,584	27,919	23,625
Car wheels and axles	752	1,113	13,159	14,941
Iron castings	675	650	9,025	9,402
Steel castings	651	358	7,874	6,080
Forgings	1,678	401	9,795	4,169
Castings and forgings	6,580	6,106	67,772	58,217
All other	1,964	940	13,784	12,375
Total	256,870	170,866	2,384,301	1,836,730

Imports of Iron and Steel Into the United States

(In Gross Tons)

	October		10 Months Ended October	
	1928	1927	1928	1927
Pig iron	14,108	8,178	118,885	102,127
Ferromanganese*	4,039	2,109	38,716	23,220
Ferrosilicon†	155	94	3,118	6,657
Ferrochrome‡	65	3	635	415
Scrap	9,938	5,178	47,588	50,343
Pig iron, ferroalloys and scrap	28,305	15,562	208,942	182,763
Steel ingots, blooms, billets and slabs	2,005	1,149	18,619	10,568
Iron blooms, slabs, etc. ....	.....	91	4	31
Wire rods	948	2,688	13,078	14,103
Semi-finished steel	2,953	3,928	31,701	24,762
Rails and splice bars	1,057	541	14,039	15,161
Structural shapes	10,530	13,180	141,699	132,840
Boiler and other plates	2,091	2	6,759	3,250
Sheets and saw plates	782	1,222	20,694	13,161
Steel bars	4,759	5,261	75,691	77,727
Bar iron	67	10	1,680	3,174
Hoops, bands and cotton ties	1,794	3,194	17,337	29,643
Tubular products (wrought)	4,796	2,298	36,309	45,504
Nails, tacks, staples	1,089	234	8,211	5,155
Tin plate	48	70	865	1,050
Bolts, nuts, rivets and washers	46	22	222	311
Round iron and steel wire	606	202	3,826	3,373
Barbed wire	572	248	3,693	3,734
Flat wire; strip steel	222	287	1,957	2,261
Steel telegraph and telephone wire	5	.....	183	32
Wire rope and strand	117	122	1,372	1,921
Other wire	50	642	501	1,109
Rolled and finished steel	28,631	27,535	335,039	339,406
Cast iron pipe	3,838	5,265	51,152	74,610
Castings and forgings	153	219	2,468	2,382
Total	63,880	52,509	629,301	623,922
Manganese ore*	26,142	14,780	172,799	246,829
Iron ore	169,902	228,275	2,057,103	2,289,303
Magnesite .....	.....	29	38,391	36,222

*Manganese content only.

†Silicon content only.

‡Chromium content only.

Destination of Iron and Steel Exports from the United States (In Gross Tons)

Country of Destination	October, 1928	January Through October		Country of Destination	October, 1928	January Through October	
		1928	1927			1928	1927
North and Central America and West Indies	136,092	1,162,990	915,592	Greece	39	1,946	3,546
Canada and Newfoundland.....	113,103	970,391	700,486	Italy	3,604	85,217	40,019
Cuba	6,246	53,503	82,342	Netherlands	109	1,812	11,726
Mexico	6,354	67,494	68,980	Russia	90	2,697	7,409
Guatemala	342	6,760	5,639	United Kingdom	5,371	44,445	57,929
Panama	2,011	13,660	16,268	Other Europe	1,755	93,297	47,673
Salvador	254	2,899	3,578	Far East	68,137	600,801	437,882
British West Indies.....	615	6,535	10,908	British Malaya	29	5,483	7,479
Other West Indies.....	6,200	28,985	16,927	China	4,965	81,851	44,706
Other Central America.....	967	12,758	10,464	Dutch East Indies.....	3,657	34,107	31,132
South America	38,353	361,578	290,666	India and Ceylon.....	1,322	19,979	23,328
Argentina	10,126	82,285	68,266	Japan and Chosen.....	47,894	345,913	227,445
Brazil	9,239	69,792	57,630	Kwangtung	809	13,165	18,722
Chile	3,903	56,674	35,603	Philippine Islands	6,498	71,125	51,502
Colombia	4,967	54,035	48,214	Australia	1,020	13,263	23,397
Peru	3,244	22,393	28,372	New Zealand	177	1,978	1,024
Uruguay	606	7,368	9,290	Other Asia and Far East.....	1,766	13,937	9,147
Venezuela	5,907	64,893	40,558	Africa	958	11,149	14,950
Other South America.....	361	4,138	2,733	British South Africa.....	653	5,055	7,356
Europe	13,330	247,783	177,640	Egypt	31	3,456	3,124
Belgium	999	13,174	5,120	Mozambique	85	1,091	3,575
France	1,363	5,195	4,218	Other Africa	189	1,547	895
				Total	256,870	2,384,301	1,836,730

tons to Canada. Scrap exports, however, were 19,098 tons below the 58,511 tons exported in September. Plain structural shape exports increased by 12,470 tons, amounting to 25,847 tons as compared with 13,377 tons. Of the exports of plain material exported in October Canada took 23,015 tons. Outgoing shipments of boiler tubes and welded pipe in October amounted to 24,931 tons, an increase of 7948 tons over the 16,991 tons exported in September.

Of the 12,987 tons of casing and oil line pipe exported in October, 4450 tons went to Venezuela, 2271 tons to the Dutch West Indies, 1858 tons to Argentina and 966 tons to Colombia. Of the 6085 tons of welded black pipe exported that month, 1421 tons went to the United Kingdom, the remainder being widely distributed. Exports of plates in October, amounting to 16,264 tons, made a gain of 5467 tons over the 10,989 tons exported in September; Canada took 12,972 tons. Of the 16,264 tons of steel bars exported in October, an increase of 4479 tons over the 11,785 tons exported in September, Canada took 11,133 tons.

Galvanized steel sheet exports in October, amounting to 13,046 tons, reflected a gain of 4345 tons over the 8701 tons exported in September. Brazil took 2582 tons, Canada 1927 tons and the Philippine Islands 1514 tons. Of the 14,258 tons of black steel sheets exported in October, 7429 tons went to Canada, 2940 tons to Japan and 1375 tons to Italy. Exports of black steel sheets in September were 12,038 tons, a decrease of 2220 tons under those for October.

Tin plate exports in October, amounting to 18,180 tons, showed a gain of 2709 tons over the 16,471 tons exported in September. Of the October shipments, Japan took 4176 tons; China, 2788 tons; Canada, 2319 tons; Argentina, 2129 tons; Brazil, 1281 tons; Peru, 1011 tons.

Of the 21,885 tons of ingots and semi-finished material exported in October, Canada took 20,802 tons, made up of 16,234 tons of skelp and

4568 tons of ingots. Exports of steel rails in October declined to 9347 tons from 16,466 tons in September. Of the October shipments, Canada took 3355 tons; Brazil, 1341 tons; Mexico, 1206 tons; Cuba, 973 tons, and Argentina, 616 tons.

Canada, as usual, was by far the largest consumer of American exports, taking 113,008 tons in October. Japan ranked second, with 47,894 tons, while Argentina was third, with 10,126 tons.

Main Import Items

Pig iron constituted the largest item of importation in October, incoming shipments amounting to 14,108 tons, of which 7702 tons came from the United Kingdom. Of the 4759 tons of steel bars imported in the month, 2105 tons came from Germany and 1217 tons from Belgium, usually the largest supplier of steel bar imports. Of the 10,530 tons of structural shapes imported, 6301 tons came from Belgium, 3069 tons from Germany and 1004 tons from France.

Lower Imports of Iron Ore in October

WASHINGTON, Nov. 24.—Imports of iron ore in October declined to 169,902 tons from 211,494 tons in September, Chile supplying 91,000 tons of the October total and French Africa 41,500 tons. For the 10 months ended with October iron ore imports were 2,057,103 tons, against 2,289,312 tons for the corresponding period of last

Of the 3838 tons of cast iron pipe imported, 3481 tons came from France. Soviet Russia supplied 12,600 tons of the 26,142 tons of manganese ore imported, while 6469 tons came from Brazil and 6273 tons came from India. Of the 4039 tons of ferromanganese imported, 1760 tons came from Norway, 1653 tons from Canada and 420 tons from the United Kingdom. Of the 4796 tons of tubular products, other than cast iron pipe, imported in October, 2966 tons came from Germany.

Great Britain led as the source of October imports, supplying 12,140 tons; Germany was second, with 11,985 tons, and Belgium third, with 10,371 tons.

Scrap imports were the largest for any month in two years. Imports of finished and rolled material were, with the exception of those in July, the smallest for any month since November, 1927. Steel bars came in in the lightest amount since March, 1926. Structural steel imports were the smallest since February, 1927.

year. Chile led by far as the source of these imports for both periods, furnishing 1,170,100 tons during the 10 months of the current year and 1,166,400 tons for the corresponding period of last year.

Owing largely to the strike in Sweden, the 10-month 1928 total from that country, 19,614 tons, was less than 9 per cent of the 1927 shipments. Shipments from Cuba fell off 63,000 tons, while those from Canada showed an advance of nearly 29,000 tons.

SOURCES OF AMERICAN IMPORTS OF IRON ORE (In Gross Tons)

	October		Ten Months Ended October	
	1928	1927	1928	1927
Chile	91,000	121,800	1,170,100	1,166,400
Cuba	11,500	25,500	277,286	340,113
Spain	7,557	448	29,765	27,165
Sweden .....	...	21,470	19,614	224,280
French Africa	41,500	48,999	403,630	419,821
Canada .....	...	432	45,359	16,667
Other countries	18,345	9,635	111,349	94,866
Total	169,902	228,284	2,057,103	2,289,312

Machinery Markets and News of the Works

Heavy Machine Tool Buying

Wright Aeronautical Corporation Orders About \$350,000
Worth and Eaton Axle & Spring Co.'s Purchases
Total About \$300,000

HEAVY buying of machine tools featured the business of the past week. Outstanding were the orders of the Wright Aeronautical Corporation, Paterson, N. J., totaling \$350,000 or more, and those of the Eaton Axle & Spring Co., Cleveland, amounting to \$300,000. The latest purchases by the Wright Aeronautical Corporation bring its expenditures for machine tools in the past several months to at least \$1,000,000 and are part of a program of plant expansion begun early in the year. The Eaton company's purchases are to equip a new plant which will manufacture motor truck axles.

Other orders and inquiries received during the week were of such size as to command unusual attention. R. Hoe & Co., New York, printing press manufacturers, bought 10 milling machines and four planers; a company in the Detroit district has ordered about \$50,000 worth of special lathes, and the National Acme Co., Cleveland, booked a \$100,000 order for 10 machines to be shipped to Sweden. In-

cidentally, this order came from Sweden by telephone. Among pending purchases are \$500,000 worth of equipment for a Detroit automobile company for the manufacture of crankshafts, a list of 21 tools, on which prices are being submitted by Chicago dealers, and 12 turret lathes for a large metalworking plant in Sweden. An automobile company in the East which will build a car of foreign design is also in the market for considerable equipment.

While machine tool business has been on the downward trend this month, the orders of the past week will lift the sales records of companies which benefited to a level that probably will compare favorably with October totals. The high level of activities does not affect all machine tool companies alike; some are so busy that they cannot make early deliveries even by working night shifts, while others are engaged at considerably below capacity. Those making special high production tools are in most cases taxed to their utmost.

New York

NEW YORK, Nov. 27.—Extensive purchasing of tools by the Wright Aeronautical Corporation, Paterson, N. J., was a feature of the past week's machine-tool business in this district. For the second time this year, the Wright company bought upward of \$350,000 worth of equipment. The latest list included 21 milling machines, 28 small turret lathes, 15 sensitive radial drills, 12 grinders, 15 single and multiple drill presses, 2 Mult-Au-Matics, 4 crankshaft lathes. The Curtiss Aeroplane & Motor Corporation, Buffalo, continues a small buyer of machine tools for its plant at Buffalo. R. Hoe & Co., New York, have closed on 10 milling machines and four planers and the Bethlehem Shipbuilding Corporation has bought four lathes for its Fore River shipyard. The General Electric Co., Schenectady,

N. Y., has closed on a large lathe for use at Schenectady and a number of tools for Bloomfield, N. J., including turret lathes and drills.

A list of 16 tools has been sent out for bids by Department of Public Instruction, Albany, N. Y. The inquiry consists of two 14-in. x 6-ft. thread cutting lathes, three 11-in. x 5-ft. thread cutting lathes, two 11-in. x 5-ft. South Bend thread cutting lathes, two 9-in. x 4-ft. bench lathes, one universal milling machine, one 16-in. shaper, one 18-in. vertical drill, one sensitive drill, one universal grinder, one Peerless power hack saw, one portable electric drill, a Buffalo forge and blower, Stewart gas furnace and an anvil.

Sales reported the past week by Pratt & Whitney Co. include a deep hole drill, 14-in. vertical surface grinder, 6-in. and 10-in. thread milling machines, two No. 2 jig borers, 6-in. vertical shaper, 13-in. lathe, special Sigourney drill. Sales by Niles-Bement-Pond Co. included two 48-

in. Niles carwheel borers, 8-in. Williams pipe machine, No. 5 Grand Rapids surface grinder, Nos. 2 and 3 Reid surface grinders, No. 13 Brown & Sharpe universal tool grinder and a 16-in. Niles-Acme shaper.

Bids will soon be asked by Western Electric Co., 195 Broadway, New York, for five-story plant at Emeryville, Cal., to cost close to \$500,000 with machinery. Pacific Coast headquarters are at 630 Folsom Street, San Francisco. Engineering department of company in charge.

William C. Sommerfeld, 31 Union Square, New York, architect, has filed plans for a five-story automobile service, repair and garage building at 524-28 East Seventy-third Street, to cost about \$160,000 with equipment.

Nichols Copper Co., 25 Broad Street, New York, has plans for addition to plant at Laurel Hill, L. I., one-story, 60 x 275 ft., to cost over \$175,000 with equipment.

Johns-Manville Corporation, Madison Avenue and Forty-first Street, New York, has purchased plants and business of Celite Co., Los Angeles, manufacturer of temperature insulation products, filtration materials, etc., with properties at Lompoc, Cal., and will operate as a division of its business. Plans are under way for increase in output of Celite specialties.

Following recent acquisition of Fort Henry Light, Heat & Power Co., Port Henry, N. Y., by New York Power & Light Corporation, Albany, N. Y., last-noted company will carry out expansion program in Madison and Cortland Counties, including transmission lines, power substations, etc., to cost approximately \$800,000.

Phelps-Dodge Corporation, 99 John Street, New York, is completing plans for electrolytic copper refinery at El Paso, Tex., to cost over \$3,000,000 with machinery. Project will include power house and machine shop.

American Aeronautical Corporation, 730 Fifth Avenue, New York, recently organized, has concluded negotiations for American rights for production of Savoia-Marchetti seaplanes and other commercial aircraft, from Italian company of that name. It is proposed to build plant on Long Island, comprising parts manufacture and assembling divisions. Motors will be secured from outside sources. Enea Bossi is one of heads of new company.

Bushwick Can Co., 86 Butler Street, Brooklyn, manufacturer of tin cans, boxes, etc., has plans for one-story factory to cost about \$45,000 with equipment. V. A. Lacerenza, 26 Court Street, is architect.

War Department, Washington, has awarded contract to Asdlen Construction Co., Philadelphia, for group of 38 buildings at Picatinny Arsenal, Dover, N. J., to replace structures destroyed by fire several months ago, at cost of \$793,516.

Gates-Day Aircraft Corporation, East Twenty-fourth Street, Paterson, N. J., has leased mill on East Sixteenth Street, totaling about 35,000 sq. ft. floor space, and will remodel for new plant unit. Present works will be continued.

Truscon Steel Co., Youngstown, Ohio, is

The Crane Market

NEW inquiry for overhead traveling cranes continues slack, but there is some substantial business in the market, expected to be placed before the end of the year. Fox Brothers International Corporation, New York, has been asking for prices on 17 special "automobile cranes" for export. Business in locomotive cranes is quiet, but New York subway contractors have appeared in the past week as buyers of short boom shovels for tunnel work. Western Electric Co., Chicago, is in the market for a 10-ton crane for its cable plant.

Among recent purchases are:

Morse-Rogers Steel Co., Glendale, L. I., 5-ton, 67-ft. 6-in. span, 3-motor, overhead crane, reported purchased from Milwaukee Electric Crane & Mfg. Corporation.

Rosenthal Engineering Contracting Co., 12 East Forty-first Street, New York, two short boom shovels for tunnel work, from Bucyrus-Erie Co.

Philip J. Cogan, contractor, New York, two short boom shovels for tunnel work, reported purchased from Bucyrus-Erie Co.

Carnegie Steel Co., two 15-ton, 31-ft. 4-in. span double line bucket cranes for Duquesne works, to Alliance Machine Co.

Oscar Daniels Co., a 22-ton, standard gage, steam operated, rebuilt railroad crane from Orton Crane & Shovel Co.

Acme Steel Co., Chicago, has ordered an overhead electric crane from Whiting Corporation.

Missouri-Pacific has ordered for Falls City, Neb., a 15-ton, 46-ft. span electric crane from Manning, Maxwell & Moore, Inc.

considering one-story factory branch and distributing plant at Harrison, N. J., to cost about \$40,000.

Passaic Valley Sewage Commission, 20 Branford Place, Newark, is considering installation of Diesel oil-burning engines at Newark Bay pumping station to replace present coal-burning equipment. Estimates of cost will be made by Joseph Hecking, 94 Wheaton Place, Rutherford, N. J., combustion engineer.

Public Service Electric & Gas Co., Public Service Terminal, Newark, is reported planning new power switching station at Elizabeth, N. J., to cost more than \$1,000,000 with transmission lines and equipment.

Elevating and conveying machinery, packing and other equipment will be installed in six-story addition, 124 x 200 ft., to plant of Hoffman Beverage Co., 402 Grove Street, Newark, to cost more than \$350,000. Edward C. Epple, 44 Commerce Street, is architect.

Universal Body Building Co., Inc., 7 Liberty Street, Lodi, N. J., has been organized to build and repair commercial vehicle bodies. Company will be in market for materials and equipment.

Albert & Davidson Pipe Corporation, 256 Oakland Street, Brooklyn, used pipe dealer, has purchased plant, stock, equipment and good will of McMann & Taylor, Second Avenue, Fifty-first and Fifty-second Streets, Brooklyn, and is moving to new quarters on Dec. 1. Plant has 20,000 sq. ft. of floor space, and will provide considerably increased facilities.

Knickerbocker, Cram & Co., 7 East Forty-second Street, New York, have been appointed agents in the New York territory for production and tool room lathes made by Porter-Cable Machine Co., Syracuse, N. Y.

Buffalo

BUFFALO, Nov. 26.—Dunkirk Radiator Corporation, Dunkirk, N. Y., has been organized to manufacture radiators and boilers. Company has acquired property on Middle Road, Dunkirk, and has begun construction of building, 120 x 450 ft.

National Carbon Co., 3625 Highland Avenue, Niagara Falls, N. Y., has taken bids on general contract for one-story addition, to cost about \$50,000 with equipment. Headquarters are at 30 East Forty-second Street, New York.

Stafford & Holt, Inc., Little Falls, N. Y., has been formed with capital of \$100,000 to take over and expand company of same name, with local plant for manufacture of knitting machinery and

parts. New organization is headed by Walter Stafford and James C. Bronner, both of Little Falls.

St. Regis Paper Co., Watertown, N. Y., is concluding negotiations for purchase of controlling interest in Cellulosa Cubana Co., Havana, Cuba, manufacturer of paper goods. Purchasing company plans enlargement of mill of Cellulosa company, as well as construction of new paper mill in vicinity of Havana, entire project to cost more than \$1,000,000. Company recently disposed of stock issue to total about \$11,250,000, portion of proceeds to be used for expansion.

Houdaille Corporation, Buffalo, has been organized to take over and expand Houde Engineering Corporation, 537 East Delevan Avenue, Buffalo, manufacturer of Houdaille hydraulic shock absorbers. New company will be capitalized with 256,000 shares of stock, and will be headed by Claire L. Barnes, also president of Oakes Products Corporation, Indianapolis, manufacturer of automobile specialties. Frederick B. Cooley, president New York Car Wheel Co., Niagara Street, Buffalo, has also secured substantial interest in company.

New England

BOSTON, Nov. 26.—November probably will be the best month experienced by the local machine tool trade since early this year. Few new inquiries are in hand, but dealers still have a sizable number pending that hold promise of early closing. Some New England railroads are expected to be active purchasers of shop equipment in 1929.

During the past week a Massachusetts airport bought 10 machine shop tools, and the Atlantic Works, East Boston, purchased a shaper, a milling machine, one 15-ton and one five-ton crane for its new machine shop, and is expected to close on other equipment this week. A 3-ft. radial drill and a bench milling machine went to Massachusetts manufacturers. In the used tool market several 8-in. lathes, three shapers, two upright drills, a planer and a few screw machines were among those sold to Massachusetts shops.

Charles R. Graco, 11 Beacon Street, Boston, architect, will close bids Dec. 4 on a three-story and basement school, 80 x 200 ft., at Cambridge, to contain a manual training department and to cost \$650,000 with equipment.

Draper Corporation, Hopedale, Mass., textile machinery, has plans for a two-story assembling plant at Spartanburg,

S. C., to contain a small machine shop. J. E. Firrinc & Co., Greenville, S. C., are engineers.

Frank Irving Cooper Corporation, 172 Tremont Street, Boston, architect, will close bids Dec. 4 on a two-story, 78 x 104 ft., and one-story 44 x 97 ft. grade schools for Ashland, Mass., to cost \$100,000 without equipment, to contain manual training departments. C. E. Cristman, Framingham, Mass., is chairman of building committee.

Berkshire Sanitary Ice Co., Pittsfield, Mass., is having plans prepared for a 2½-story ice making plant 70 x 115 ft. Miscellaneous equipment is required.

New York, New Haven & Hartford Railroad Co., New Haven, Conn., has plans for one-story repair shop at Dedham, Mass., for sand-blast and other service, 100 x 150 ft., to cost over \$50,000 with equipment.

National Brake Service, Inc., 562 Commonwealth Avenue, Boston, automobile equipment, has leased space in building at 922 Commonwealth Avenue, for new plant.

American Tube & Stamping Co., 766 Stratford Avenue, Bridgeport, Conn., has awarded general contract to T. J. Pardy Construction Co., 1481 Seaview Avenue, for three-story addition, 36 x 100 ft., to cost more than \$65,000 with equipment.

Cornell Multi-Wall Valve Bag Co., East Pepperell, Mass., has awarded general contract to H. L. Shattuck, Inc., South Street, Manchester, N. H., for a one-story unit, 100 x 150 ft., to cost more than \$75,000 with equipment.

Standard Oil Co. of New York, 26 Broadway, New York, has filed plans for an addition to storage and distributing plant at Lowell, Mass., to cost about \$40,000 with equipment.

Hanson Whitney Machine Co., Inc., 169 Bartholomew Avenue, Hartford, Conn., manufacturer of special machinery, has awarded contract to A. F. Peaslee, Inc., Hartford, for a one-story addition, 50 x 67 ft. Ebbets & Frid, Hartford, are architects.

Philadelphia

PHILADELPHIA, Nov. 26.—Plans are being drawn by I. Fischman & Sons, Tenth Street and Allegheny Avenue, Philadelphia, manufacturers of soda water equipment, for a one-story addition, to cost about \$40,000 with machinery. Clarence E. Wunder, 1520 Locust Street, is architect.

Karl F. Otto, 1828 Arch Street, Philadelphia, architect, has filed plans for a two-story automobile service, repair and

garage building, to cost over \$100,000 with equipment.

William R. Rorer, 1120 Harrison Street, Philadelphia, and associates have organized Columbia Welding Co. to operate a machine and welding works, and will begin production soon. Edward A. Lynch, 2516 South Twenty-second Street, is also interested in new company.

Machine shop and tools, buildings and real estate of Trexler Co. of America, Inc., Wilmington, Del., will be offered at a public sale Dec. 5, by Delaware Trust Co., Wilmington, trustee for creditors.

Blackmer Pump Co., Grand Rapids, Mich., has leased property at Delaware Avenue and South Street, Philadelphia, in Bailey warehouse group, for local factory branch and distributing plant.

Thomas Halton's Sons, Mascher Street, Philadelphia, manufacturers of silk mill machinery, have plans for one-story machine shop, 69 x 240 ft. W. E. S. Dyer, Land Title Building, is architect and engineer.

Bridgeton Sand Co., Bridgeton, N. J., plans rebuilding power house and glass sand producing plant at Berlin, partly destroyed by fire Nov. 21. Adjoining glass sand plant of Pennsylvania Pulverizing Co. was also damaged and will be rebuilt. Headquarters of latter company are at Lewistown, Pa.

Board of Education, Camden, N. J., is considering installation of manual training equipment in new Woodrow Wilson junior high school, East Camden, to cost over \$500,000, for which bids will be received on general contract on Dec. 6. Davis, Dunlap & Barney, 1805 Walnut Street, Philadelphia, are architects.

Scranton School District, 425 Washington Avenue, Scranton, Pa., has awarded contract to R. D. Richardson Construction Co., Connell Building, for central power plant at Adams Avenue and Gibson Street, to cost about \$230,000 with equipment.

Philadelphia & Reading Coal & Iron Co., Reading Terminal, Philadelphia, has plans for new coal breaker at Locust Summit, Pa., to cost more than \$500,000 with equipment.

International Coal Combustion Co., operated by International Combustion Engineering Corporation, 200 Madison Avenue, New York, has closed contract for supply of gas to Lukens Steel Co., Coatesville, Pa., and will soon begin construction of low temperature coal carbonization plant. Power plant will have initial capacity of about 1,750,000 cu. ft. daily, with ultimate output of about twice that amount. Completion is scheduled early in 1930.

Bellanca Aircraft Corporation, New Castle, Del., has disposed of stock issue to net close to \$2,000,000, considerable portion of fund to be used for expansion at local plant. Company will also provide for manufacture of new types of commercial airplanes.

St. Louis

ST. LOUIS, Nov. 26.—Emery-Carpenter Container Co., June and Long Streets, Cincinnati, manufacturer of fibre shipping drums and other fibre products, has leased part of building at 2731 Papin Street, St. Louis, for branch plant. Machinery installation will cost over \$40,000. St. Louis offices are at 705 Olive Street.

American Eagle Aircraft Corporation, 2800 East Thirteenth Street, Kansas City,

Mo., E. E. Porterfield, Jr., head, has asked bids on general contract for new plant in Fairfax industrial district, consisting of two buildings, one-story, 100 x 300 ft., and two stories, 30 x 70 ft., to cost over \$80,000 with equipment. Chester E. Dean, Reliance Building, is architect.

St. Louis Body Equipment Co., St. Louis, manufacturer of automobile bodies, has begun construction of one-story plant at Forest Park Boulevard and Sarah Street, totaling 15,000 sq. ft. floor space, to cost about \$35,000 with equipment. I. O. Boorman is president.

Always-A-Head Mills, Inc., Thirty-fifth Street, East St. Louis, Ill., has awarded general contract to Humphries Contracting Co., Pierce Building, St. Louis, for six-story flour mill, 60 x 142 ft., with grain elevators of 40,000 bu. capacity, to cost over \$250,000. Equipment will include elevating, conveying, screening and kindred machinery.

W. S. Frank, Century Building, St. Louis, architect, is completing plans for three-story automobile service, repair and garage building, 70 x 175 ft., reported to cost about \$115,000 with equipment.

Swallow Airplane Co., Wichita, Kan., has arranged for sale of stock to total \$360,000, fund to be used for expansion, including new buildings and equipment for production of biplanes and parts. William B. Moore is president.

Marshall Supply Co., Inc., Pittsburg, Kan., and Tulsa, Okla., has been appointed distributor in that territory for refractory materials manufactured by Bottfield Refractories Co., Philadelphia.

St. Louis Southwestern Railway is in the market for a heavy-duty, motor-driven, coach wheel lathe, capacity to handle carwheels, trailer wheels, engine and tender truck wheels for its shops at Pine Bluff, Ark., and a driving motor-driven wheel lathe with capacity to turn tires up to 86-in. tread diameter, for shops at Tyler, Tex.

Cincinnati

CINCINNATI, Nov. 26.—While some machine tool builders report that the trend of sales has been slightly downward this month, a few important companies have had gains as high as 25 per cent above October volume. In the aggregate, however, bookings in the local market have fallen a little short of those in October, although orders still remain far above what has been regarded as normal in the past few years. The liberal amount of inquiries before the trade gives promise of a continuation of good business during the remainder of the year and no sharp let-down from the present high average is yet in sight.

The matter of deliveries is giving some concern to Cincinnati machine tool plants, some of which are finding it necessary to operate night shifts to take care of current orders. Unfilled bookings which have accumulated recently give assurance of the maintenance of production on the present scale until after the first of the year, at least. That the high level of activities does not affect all machine tool companies is a fact worthy of note. Plants turning out special high production tools are taxed to capacity, whereas, those shops devoted to standard equipment, especially to large tools, are less busy. However, there has been an increase in sales of tools of the latter type in the past two weeks.

Pending business in the automobile in-

dustry is of large volume. A prominent Detroit maker is negotiating for the purchase of special machines costing close to \$500,000, while a foreign automobile company is expected to buy a large number of tools. A company in the Detroit district has closed for about \$50,000 worth of special lathes. Included in purchases of the past 10 days are lathes, drilling machines and other equipment for Eastern airplane motor manufacturers. Missouri Pacific Railroad has placed an order for three engine lathes with a local builder.

G. & G. Mfg. Co., Cincinnati, stamp and die maker, has purchased a building at 2116 Colerain Avenue and will transfer operations to new plant.

Aeronautical Corporation of America, Cincinnati, has been incorporated to manufacture airplanes, airplane motors and other airplane parts, and will construct a plant, 100 x 300 ft., at Municipal Airport. C. G. Dietz, formerly of Dayton, Ohio, will be in charge.

C. Heckel and C. A. Klump have taken over management of Charles A. Taylor Mfg. Co. and El. Connier Machine Co., 120 Opera Place, Cincinnati, and now are operating as H. & K. Machine Co.

Bids will soon be asked by Columbus Heating & Ventilating Co., 425 West Town Street, Columbus, Ohio, for three-story factory, to cost about \$40,000 with equipment.

Walter E. Schott Co., 2340 Gilbert Avenue, Cincinnati, automobile dealer, has plans under way for five-story service, repair and sales building, to cost about \$150,000 with equipment.

National Cash Register Co., Dayton, Ohio, is concluding arrangements for purchase of plant and business of Ellis Adding Typewriter Co., 338 Elizabeth Avenue, Newark, N. J., and will operate as division of National company. Expansion program is planned for manufacture of Ellis type machines.

Goodyear Tire & Rubber Co., Akron, Ohio, has plans for one-story factory branch and distributing plant, 65 x 190 ft., at Knoxville, Tenn., to cost about \$85,000 with equipment. Ryno & Brackney, Brownlow Building, Knoxville, are architects.

Plans have been arranged for merger of Fairbanks Co. and O. S. Kelly Co., both manufacturers of plano plates and kindred castings, with plants at Springfield, Ohio. An expansion program will be carried out. M. L. Milligan, heretofore president of Fairbanks Co., will head consolidated organization.

Board of County Commissioners, Court House, Cincinnati, is said to be planning construction of one-story foundry, shop and power house for County equipment, to cost more than \$200,000 with machinery.

Detroit

DETROIT, Nov. 26.—Contract has been let by Machine Specialty Co., Main Street, Pontiac, Mich., to Austin Co., Detroit, for two-story and basement unit, 38 x 100 ft., to cost about \$45,000 with equipment.

Fisher Body Corporation, Detroit, is planning an expansion program at Pontiac plant, including new buildings and installation of additional equipment, to cost about \$750,000.

Evans Auto Loading Co., Dime Bank Building, Detroit, manufacturer of automobile loading devices, has acquired plant and business of Western Lumber Mfg. Co., Marshfield, Ore., for expansion

for production of battery boxes and battery separator plates.

Stinson Aircraft Corporation, Northville, Mich., is having plans drawn for one-story addition, to cost about \$150,000 with equipment. F. J. Winter, Book Building, Detroit, is architect.

City Commission, Pontiac, Mich., has approved purchase of 80 acres for expansion at municipal airport, providing total of 240 acres, to include construction of new hangars, repair shops and other facilities.

Re-Nu Corporation, a subsidiary of Borg-Warner Corporation, Holland, Mich., operating O. E. Szekely Corporation, manufacturer of automotive equipment, has acquired a building on Eighth Street for production of piston rings, with initial output of about 1,000,000 per month. Later plant will be built for Re-Nu organization, as well as Szekely company and other interests.

Goddard & Goddard Co., 4724 Hastings Street, Detroit, manufacturer of tools, etc., is planning one-story addition, to cost about \$100,000 with equipment.

Square D Co., 6060 Rivard Street, Detroit, manufacturer of electrical switches, etc., has awarded general contract to W. E. Wood Co., Ford Building, for three-story addition, to cost about \$115,000 with equipment.

Federal Steel Corporation, Detroit, has awarded a general contract to Austin Co. for one-story addition to storage and distributing plant, with overhead traveling cranes and other handling facilities, to cost over \$60,000; company will also erect a new office building.

Gorham Tool Co., 2206 Twelfth Street, Detroit, has plans for one-story unit, 120 x 125 ft., to cost more than \$75,000 with equipment. Bids will soon be asked by Lane, Davenport & Peterson, Charlevoix Building, architects.

Cleveland

CLEVELAND, Nov. 26.—Machine tool business came out in heavy volume the past week. The Eaton Axle & Spring Co., Cleveland, purchased \$300,000 worth of machinery for a new local plant under construction for the manufacture of motor truck axles. Nearly one-third of this amount covered boring and drilling machinery that was placed with a Cleveland dealer. The remainder was largely special production machinery.

National Acme Co., Cleveland, took an order for one of its largest automatic 3 5/16 in. 4-spindle machines for a metal-working plant in Sweden. This order, amounting to \$100,000, was placed by the Aktiebolaget Servus machinery agency, and was transmitted by telephone from Sweden to the Windsor, Vt., plant of the National Acme Co. Another Swedish company has an inquiry out for 12 turret lathes.

Reports from abroad indicate that some European machinery users are selling their old machine tools to Russia and replacing them with more modern American machinery. Other orders placed with Cleveland manufacturers during the week included six turret lathes by the Wright Aeronautical Corporation, Paterson, N. J. Increased activity the past week has brought November sales well ahead of October. Deliveries of some lines are becoming more extended.

Geometric Stamping Co., 221 East 131st Street, Cleveland, will erect a new plant

that will largely increase its capacity. Plans for first unit, 250 x 600 ft., are being prepared by Austin Co. Other units to be built later will increase the floor space to 600,000 sq. ft. Company manufactures automobile stampings and other pressed steel products.

Gluntz Brass Co., Cleveland, has purchased plant formerly occupied by K. & M. Brass & Aluminum Castings Co., on Harvard Avenue, which includes 16,000 sq. ft. of floor space occupied by foundry and finishing departments. Gluntz company will erect a one-story machine shop, 60 x 100 ft.

Central Wire Nail & Specialty Co., Cleveland, has been organized to manufacture airplane wire and special nails for automotive and airplane industries, and has taken over the plant of Brightman Machinery Co., East Seventy-first Street and Quincy Avenue, containing 20,000 sq. ft. of floor space. New equipment will be installed and it is expected plant will be ready for operation about Jan. 1. Officers are John J. Sullivan, Jr., president; John B. Ritchey, vice-president and W. H. Thomas, treasurer, all of whom have been connected with Stronach Nail Co., Pittsburgh.

Chase Brass & Copper Co., Bridgeport, Conn., which will erect a plant in Cleveland to supply its Western trade, has acquired a 60-acre site on Babbitt Road and New York Central and Nickel Plate Railroads. Contract for first unit has been placed with Austin Co. It will be 225 x 1000 ft., one floor, but equivalent in height to a three-story building. Several 5 and 10-ton electric traveling cranes will be required.

Murray Ohio Mfg. Co., Cleveland, maker of automobile stampings and all steel toys, will erect an addition. Company is offering \$1,000,000 of 10-year, 6½ per cent sinking fund gold debentures, proceeds of which will be used for retirement of a \$250,000 mortgage and \$307,300 of 8 per cent preferred stock and toward the cost of plant extension.

Kelley Reamer Co., 3705 West Seventy-third Street, Cleveland, is considering one-story addition, to cost more than \$35,000 with equipment.

General Tire & Rubber Co., 1709 Market Street, Akron, Ohio, has awarded general contract to C. W. & P. Construction Co., Second National Bank Building, for two and four-story addition, to cost \$200,000 with equipment.

Cleveland Automatic Machine Co., 2269 East Sixty-fifth Street, Cleveland, manufacturer of machine tools, etc., is considering plans for one-story plant at Elyria, Ohio, totaling 175,000 sq. ft. floor space, to cost more than \$250,000 with equipment. Company is said to be planning removal of present works to new location and concentrating production there. H. W. Ruppel is general manager.

Industrial Steel Casting Co., Millard Avenue, Toledo, Ohio, has awarded general contract to Comte-Naumann Co., 912 Summit Avenue, for one-story addition, 140 x 175 ft., to cost over \$180,000 with equipment.

City Ice & Fuel Co., 6611 Euclid Avenue, Cleveland, is arranging expansion program in ice-manufacturing and cold storage plants to cost approximately \$1,500,000 with equipment, including addition to plant on Union Avenue, S. E.; additional coal-handling facilities at yard at Payne Avenue and East Fortieth Street; new plants at Willoughby and Hilltop, Columbus, Ohio; electrification and enlargement of ice plant at Norwood, Cincinnati; new plants at Westwood, near Cin-

cinnati, and at Fort Thomas, Ky.; addition to Inwood plant, New York; ice plant at Troy, N. Y.; and two new car-icing plants in South and Middle West. Company has recently acquired Lexa Ice Co., Lexa, Ark., and plans expansion at that place.

Chicago

CHICAGO, Nov. 26.—The situation in the local machine tool market is little changed from a week ago. Some sellers find the volume of purchases well sustained while others report a gradual decline in orders. Many buyers are studying their expenditures for the year now closing, and much of the pending business will probably be deferred until early in 1929.

A number of buyers, including the railroads, are looking forward to budget requirements for next year and are asking for preliminary figures. This action, especially on the part of the railroads, is looked upon with satisfaction by dealers who this year derived little business from that source. Greater interest is noted among manufacturers of road building machinery. One list for 21 tools is now before the trade and another sizable request for prices is expected soon. Several lines of boring mills and grinders have been advanced in price. An engineering firm in Chicago has ordered a 20-in. x 10 ft. geared-head lathe.

Caspers Tin Plate Co., 3414 West Forty-eighth Place, Chicago, will build a factory 100 x 350 ft., to cost \$100,000. A. Epstein is engineer.

Victor Mfg. & Gasket Co., 5701 Fillmore Avenue, Chicago, will erect a seven-story brick addition to cost \$150,000. Frank D. Chase is architect.

American Pneumatic Cleaning Co., 1035 West Lake Street, Chicago, will build an addition, 125 x 125 ft., to cost \$35,000.

Elgin Stove & Oven Co., North State Street, Elgin, Ill., is considering one-story addition, 50 x 135 ft., to cost over \$60,000 and will begin work next year.

Illinois Tool Works, 2501 North Keeler Avenue, Chicago, has awarded general contract to Joseph Haigh & Sons, 140 South Dearborn Street, for one-story addition, to cost about \$35,000. Puckey & Jenkins, 400 North Michigan Avenue, are architects.

Atomized Fuel Corporation, Fort Dodge, Iowa, will soon take bids for new one-story plant for special fuel production, to cost about \$75,000 with machinery. F. W. Griffith, Snell Building, is architect. Pennsylvania Engineering Co., New Castle, Pa., is engineer.

All-Steel Equipment Co., Aurora, Ill., is arranging for early construction of one-story addition, to cost about \$27,000 with equipment. Herbert E. Spieler, Graham Building, is architect.

Minnesota Valley Canning Co., Montgomery, Minn., plans installation of boiler equipment, stokers, deep-well pumping machinery and motor-driven factory equipment in new unit to cost about \$85,000. Ralph W. Richardson, Zenith Building, St. Paul, Minn., is engineer.

City Council, Ottumwa, Iowa, is planning municipal hydroelectric generating plant on Des Moines River, to cost close to \$750,000, with transmission and distributing lines. Brown & Cook, 106 North Market Street, are consulting engineers.

Storkline Furniture Corporation, 4400 West Twenty-sixth Street, Chicago, is hav-

ing plans drawn for one-story addition, to cost \$160,000 with equipment. R. B. Kurzon, 105 West Monroe Street, is architect.

Imblum Aeronautical Co., 430 West Fifth Street, Pueblo, Colo., has plans for new plant, including parts production and assembling departments, to cost about \$200,000 with machinery. Work will begin early next year.

Central West Public Service Co., Omaha, Neb., operating Consumers Ice Co., Sioux City, Iowa, is considering new one-story ice-manufacturing plant at last noted place, to cost about \$125,000 with machinery.

Gulf States

BIRMINGHAM, Nov. 26.—Contract has been let by Missouri, Kansas & Texas Railroad Co., St. Louis, to T. H. Johnson, 107 South Ohio Street, Sedalia, Mo., for new engine house and locomotive repair shop at Smithville, Tex., to cost more than \$125,000 with equipment.

Cabell Electric Co., Jackson, Miss., electric equipment, has plans for a two-story and basement storage and distributing plant, 42 x 60 ft.

Conveying machinery, refrigerating equipment, mechanical mixers and other apparatus will be installed in new powdered and evaporated milk plant to be constructed at Waco, Tex., by Borden Co., 350 Madison Avenue, New York, to cost about \$400,000. A power house is planned.

Southeastern Power & Light Co., Birmingham, operating Alabama Power Co., and other public utilities, has organized a new subsidiary to carry out project for new steam-operated electric generating plant at Mobile, Ala., referred to under last-noted name in this column last week. New interest will be known as Southeastern Production Co., and will begin work at once. Station will have initial capacity of 10,000 hp., and ultimate cost is placed at \$1,300,000. Dixie Construction Co., another subsidiary, will be in charge of erection.

City Commission, Tyler, Tex., is planning establishment of municipal airport, to include hangar, repair shop and other units. A portion of bond issue of \$250,000, now being arranged, will be used for project.

Kelley Stove & Range Co., Leeds, Ala., recently formed by R. J. Kelley, Leeds, and associates, has begun superstructure for main unit of plant, 150 x 300 ft.

Southern Water Heater Co., Los Angeles, is reported contemplating new plant for parts manufacture and assembling at Houston, Tex., to cost over \$65,000 with equipment.

City Council, Fort Worth, Tex., has acquired tract of about 50 acres for enlargement of municipal airport, to include construction of hangars, shops and other buildings.

American Battery Products Co., Wichita Falls, Tex., is considering construction of new one-story plant, to cost more than \$25,000 with equipment.

Masonite Corporation, Laurel, Miss., manufacturer of structural insulating board, has begun construction of third unit at local plant, to increase capacity close to 400,000 ft. of material per day, to be one story, to cost more than \$90,000 with equipment. High pressure boiler equipment, pumping and other machinery will be installed in power department. Company has also secured license for operation of mill in Sweden, and contemplates erection of a plant in that country during coming year.

Davison-Pick Fertilizer Co., Whitney Street, New Orleans, a subsidiary of Davison Chemical Co., Garrett Building, Baltimore, has begun work on first unit of new mill on 15-acre site at Orange, Tex., to cost more than \$100,000 with machinery. Other units will be built later, entire project to cost more than \$300,000.

Texas Corporation, Houston, Tex., is said to have concluded arrangements with Louisiana Land & Development Co. for lease of portion of company lands in Louisiana, for development for oil, natural gas and sulphur. Texas company will begin installation of machinery at early date.

South Atlantic

BALTIMORE, Nov. 26.—Continental Roofing Co., Ponca Street and Boston Road, Baltimore, has awarded general contract to Consolidated Engineering Co., 20 East Franklin Street, for one-story addition to cost about \$40,000.

Seaford Boat Works, Seaford, Del., recently organized to take over property of Seaford Marine Railway Co., is remodeling plant to build barges and other vessels.

Pearce-Young-Angel Co., Greenville, S. C., will soon take bids for two-story cold storage and refrigerating plant, 75 x 125 ft., to cost over \$75,000 with equipment. Haskel H. Martin, Vickers Building, is architect and engineer.

Board of District Commissioners, District Building, Washington, is asking bids until Dec. 10 for metal-working and wood-working machinery for new McKinley high school; until Dec. 4 for gate valves for water department.

Celanese Corporation of America, Inc., Amcelle, Md., will take bids at once for one and one-half story turbine plant for local rayon mill, to cost about \$140,000 with machinery. F. T. Small is company engineer.

Herbst Boat Works, Inc., Wilmington, N. C., recently organized by John L. Hammer, 1801 Grace Street, and associates, plans operation of local boat-building and repair works. J. T. Herbst will head new company.

Chemical & Pigments Co., Patapsco Avenue, St. Helena, Baltimore, has plans for three additions, including power house, pigment-mixing unit and storage and distributing plant, to cost over \$85,000 with equipment.

Nardin-Armstrong Corporation, Bedford, Va., H. E. Armstrong, president, manufacturer of tools, dies, steel stampings, etc., has awarded general contract to Overstreet & Overstreet, Bedford, for new plant consisting of two one-story units, 75 x 325 ft. and 40 x 100 ft., to cost about \$80,000 with equipment. C. A. Bielke is construction engineer.

Frigidaire Corporation, Dayton, Ohio, manufacturer of electric refrigerating equipment, has leased three-story building at Spartanburg, S. C., for new factory branch and distributing plant.

Board of Public Improvement, City Hall, Baltimore, C. F. Goob, city engineer, will soon take bids for municipal airport to cost more than \$1,500,000, including hangars, repair and reconditioning shops and other units.

Cathey Lumber Co., 3083 Fifth Street, Charlotte, N. C., John R. Cathey, president, has awarded general contract to Blythe & Isenhour, Brevard Court, for two-story lumber and wood-working mill, and building material plant, to cost \$100,000. Conveying, elevating and other

material-handling equipment will be installed.

Milton E. Marcuse, Jefferson Hotel, Richmond, Va., and associates have organized Rosecliff Development Corporation, to construct and operate a hydro-electric power plant on James River, near Snowden, Va., for which plans have been approved. Initial station will have capacity of 10,000 hp., and will cost more than \$250,000 with transmission lines.

Milwaukee

MILWAUKEE, Nov. 26.—Machine-tool business of most shops this month represents a satisfactory volume, although there was some let-down from the relatively active trade in September and October. Plants are still busy, many at maximum capacity and on overtime schedules to make delivery specifications. New business being received will carry high rate production through December and January, if not longer. Inquiry is also favorable to active future business.

Liberty Foundry Co., Inc., Wauwatosa, P. O. Milwaukee, has acquired McNally-Tollefson Foundry Co., Stoughton, Wis., taking possession Nov. 28. Liberty company also operates Spring City Foundry Co., Waukesha, Wis. These three plants are engaged principally in production of automobile engine cylinders and pistons. Stoughton plant, occupying gray iron foundry of former Moline Wagon Co., now owned by city of Stoughton as an industrial community, is to be acquired from city and additions made for increase in capacity. J. E. McNally, vice-president and general manager, will continue as manager of Stoughton shop. E. M. Tollefson, president, and R. I. Tollefson, secretary, are retiring. William J. Grede is president, and Ralph L. Lee, secretary and treasurer of Liberty company.

Common Council, Manitowoc, Wis., has appropriated \$250,000 for an addition and purchase of new steam or oil engine equipment for municipal light and power plant, having rejected proposals of Wisconsin Public Service Co. for a hook-up with its generating plant for additional capacity. Fred L. Alter is city engineer.

Gillette Rubber Co., Eau Claire, Wis., which is erecting a new mill, 125 x 180 ft., part two stories, will also build a general factory extension, 128 x 200 ft., one story, and a mixing room addition, 49 x 135 ft. Enlargements call for an investment of about \$500,000 and will increase capacity from 6000 tires a day to 10,000.

W. M. Welch Co., Manitowoc, Wis., manufacturer of laboratory furniture, will build an addition to cost over \$50,000. Work is to start about Jan. 1. R. G. Halverson is general manager.

Otto Blefeld Co., 202 North Water Street, Watertown, Wis., founder and machinist, is awarding contracts this week for the erection of a \$25,000 addition to accommodate production. It is undertaking under contract with newly organized Henszy De-Concentrator Co., 120 East Wisconsin Avenue, Milwaukee, manufacturer of devices to eliminate scale and corrosion in steam boilers. Arthur Kuenzi is vice-president and production manager.

Burrell Engineering & Construction Co., 513 West Jackson Boulevard, Chicago, has taken general contract to furnish and equip a truck loading plant and warehouse, five stories, 46 x 100 ft., at Milwaukee, for the Petoskey Portland Cement Co., Petoskey, Mich. It will cost about \$80,000.

Partnership of William A. Brooks and Hugo Mastaglio, doing business as Brooks Pattern & Machine Co., Milwaukee, has been dissolved. Business will be continued by Mr. Mastaglio.

Camm-Blades Machinery Co., 610 Michigan Street, Milwaukee, has been appointed agent in Milwaukee territory for Boye & Emmes Machine Tool Co., Cincinnati.

Pittsburgh

PITTSBURGH, Nov. 26.—Inquiries for machine tools and machinery still are numerous, but sales are rather few. There has been no action yet on the lists of the Carnegie Steel Co. and the Westinghouse Electric & Mfg. Co.

Hajoca Corporation, 120 South Thirtieth Street, Philadelphia, manufacturer of plumbing, heating and kindred equipment, has leased property at Lewistown, Pa., for a new factory branch and distributing plant. Present building, totaling about 12,000 sq. ft. floor space, will be remodeled and other units erected.

Fokker Aircraft Corporation, Wheeling, W. Va., has plans for new plant in East Bay District, Oakland, Cal., for parts production and assembling to cost over \$100,000 with equipment. Company will standardize on five models at this plant and at works at Wheeling and Teterboro, N. J., ranging from six-passenger planes to 14-passenger tri-motored aircraft. James A. Talbot, president Richfield Oil Co., Bartlett Building, Los Angeles, is interested in Fokker project on Pacific Coast.

American Window Glass Co., Arnold, Pa., has work under way for expansion, including installation of equipment, to cost more than \$300,000. Headquarters are in Farmers' Bank Building, Pittsburgh.

Pittsburgh & Lake Erie Railroad Co., Pittsburgh, has awarded general contract to Walker & Curley Co., Sharpsburg, Pa., for one-story addition to airbrake shop at McKees Rocks, Pa., to cost about \$50,000 with equipment. A. R. Raymer is chief engineer.

Struthers Wells-Titusville Corporation, Titusville, Pa., has been formed to take over and consolidate Titusville Iron Works Co., and Titusville Forge Co., both of Titusville, and Struthers-Wells Co., Warren, Pa., manufacturers of steam, oil and gasoline engines, oil well equipment, forgings, etc. New organization will carry out general expansion program and is disposing of bond issue of \$1,300,000, part of proceeds to be used for such purpose, consolidation, etc. J. T. Dillon is president.

Indiana

INDIANAPOLIS, Nov. 26.—Plans are being considered by Highland Iron & Steel Co., Terre Haute, Ind., subsidiary of American Chain Co., Bridgeport, Conn., for one-story addition, to cost more than \$35,000 with equipment.

Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, has plans for two-story and basement service, repair and sales building, 75 x 130 ft., at Indianapolis, to cost about \$100,000 with equipment, to be occupied under lease by Jones-Whitaker Sales Co., 343 North Capitol Avenue, Indianapolis, local representative. Ross Caldwell, 239 Cumberland Street, Indianapolis, is architect.

Board of Trustees, Indiana Village of Epileptics, Newcastle, is said to be con-

sidering construction of power plant at State farm, to cost \$50,000.

G. M. Williams, president Marmon Motor Car Co., 1039 North Meridian Street, Indianapolis, and other officials of that company, are organizing new company to manufacture airplane engines. Local factory will be established for parts production and assembling, to be expanded later for complete aircraft manufacture. New company will not be connected with Marmon company. Howard Marmon will be in charge of engineering for new organization.

Indiana Smelting & Refining Co., 1116 East Sixteenth Street, Indianapolis, is reported planning one-story addition, to cost over \$40,000 with equipment.

Stutz Motor Car Co. of America, Inc., 1002 North Capitol Avenue, Indianapolis, is arranging for increase in capital from 263,000 to 400,000 shares of stock, part of proceeds to be used for expansion, including development of smaller type automobile.

Canada

TORONTO, Nov. 26.—Machine tool sales continue in good volume. Small lists are coming out for new works, and dealers report a steady demand for single tools of a diversified nature for replacement. Car and locomotive builders have bought machine shop equipment, and the automotive industry is also furnishing a good demand. Wood-working tools are in steady call. In general the machine tool market is strong and builders report many unfilled orders on hand.

Canada Pad & Paper Co., Toronto, will start work soon on a manufacturing plant to cost \$150,000. N. A. Armstrong & Co. are architects.

Canadian de Havilland Corporation will erect a factory and hangars at Willowdale, Ont., where it has secured 20-acre site.

L. E. Shaw, Ltd., Chipman, N. S., has started work on a factory to manufacture tile, etc. Machinery will be purchased.

Fairchild Aviation Co., Grand Mere, Que., contemplates erection of an aeroplane manufacturing plant to cost \$500,000. Building will be one and a half stories, 150 x 300 ft.

Frankel Brothers, Ltd., Eastern Avenue, Toronto, has been awarded general contract for erection of a \$70,000 addition to plant of A. R. Williams Machinery Co., Toronto.

Excavation has been started for an office and factory at York Township, Ont., for Riley Engineering & Supply Co., Ltd., 360 Dufferin Street, Toronto. Factory will be one story, 92 x 175 ft., and office building, 32 x 65 ft. H. G. Duerr, 1010 Lumsden Building, Toronto, is architect.

Western Canada

Medicine Hat, Alta., is arranging to increase capacity of its local power plant at a cost of \$100,000.

Hilton Brothers, Ltd., 680 Wall Street, Winnipeg, Man., manufacturer of boiler and pipe covering, has awarded contract to John Gunn & Sons, Ltd., 508 Avenue Building, for a one-story addition, 75 x 90 ft., to cost \$40,000.

Vancouver Pile Driving & Contracting Co., Vancouver, B. C., has general contract for lumber assembly wharf and foundations for \$2,000,000 sawmill and pulp plant at Howe Sound, B. C., for Kraft Co. of British Columbia, Ltd.

Pacific Coast

SAN FRANCISCO, Nov. 22.—Vitalite Piston Mfg. Co., Santa Ana, Cal., has leased two-story factory to be erected on South Main Street for new plant, to cost about \$30,000 with equipment. W. W. Kays, Ramona Building, is architect.

Palo Alto Sheet Metal Works, 521 Ramona Street, Palo Alto, Cal., C. B. Spangler, head, has awarded general contract to Wells P. Goodenough, 310 University Avenue, for one-story unit, to cost about \$20,000 with equipment.

Bach Aircraft Co., Los Angeles, has awarded general contract to Sarver & Sarver, 727 West Seventh Street, for new parts manufacturing and assembling plant, 100 x 200 ft. and 50 x 65 ft., at Metropolitan airport, near North Hollywood, to cost about \$45,000.

Western Sulphur Co., 1 Drumm Street, San Francisco, has awarded general contract to Staton & Dean, 354 Hobart Street, Oakland, Cal., for one-story storage and distributing plant, 40 x 120 ft.

Iron Fireman Mfg. Co., 984 East Seventeenth Street, Portland, manufacturer of mechanical stokers, etc., has arranged for a stock issue of 100,000 shares, part of proceeds to be used for expansion.

Foreign

A COMPANY in Great Britain is planning for a new pulp and paper mill near Rouen, France, with capacity of 3000 tons per month, to cost more than \$2,000,000 with machinery. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Great Britain No. 76095.

Lunenburg Power, Light & Waterworks, Ltd. (Luneburger Kraft, Lichtund Wasserwerke, G.m.b.H.), Lunenburg, Germany, is disposing of bond issue of \$1,100,000 in United States, a portion of fund to be used for extensions.

Humber, Ltd., London, England, has been formed with a capital of £1,250,000 (\$6,250,000) to take over and consolidate company of same name, Commer Cars, Ltd., and Hillman Motor Car Co., Ltd., all with plants for manufacture of popular-priced automobiles. Consolidated company will develop increased output for international business.

Nationalist Government of China, Nanking, has awarded contract to Automatic Electric Co., 100 West Monroe Street, Chicago, for installation of local automatic telephone system to cost \$1,800,000, to be completed in 1929.

Officials of H. M. Byllesby & Co., 231 South La Salle Street, Chicago, operating electric light and power properties, have organized Mexican States Public Service Co., Inc. (Empresa de Servicios Publicos de los Estados Mexicanos, S. A.) to take over and consolidate a number of power plants and systems in Mexico, including generating plant at Hermosillo, Sonora; an electric and ice-manufacturing plant at Guaymas, Sonora, and electric generating station at Culiacan, Sinaloa. Plans are under way for enlargement of two first-noted plants, including installation of additional machinery and construction of transmission lines. John J. O'Brien is president of parent organization.

Thompson Purchasing Co., 8 Rue Edouard VII, Paris, France, purchasing and forwarding agent, has removed offices to 4 Rue Fignon.